THE TEXTILE MANUFACTURER

No. 1016. Vol. 85 Two Shillings and Sixpence August, 1959

Notes of the Month

SCRAPPING AND RE-EQUIPMENT

LATEST figures issued by the Cotton Board revealed that a last-minute rush by some firms to submit spinning and doubling spindles, cards and looms for scrapping by August 31 increased considerably the total of plant offered. Nearly 12,000,000 mule equivalent spindles are already scheduled for breaking-up, together with over 14,000 cards, over 95,000 looms and over 492,000 doubling spindles. The minimum targets set by the Government before it would give financial assistance to the industry in eliminating excess machine capacity was 6,000,000 spinning spindles, 45,000 looms and 400,000 doubling spindles.

Cotton union leaders have expressed grave concern over the extent and pattern of the large-scale closures. The possibilities that some already hard-hit areas may become derelict has led the unions to press for the closures to be spread over a longer period to ameliorate the unemployment situation. Although many workers will inevitably lose their jobs in this process of scrapping, the position in general, will not be as severe as the statistics might at first suggest. Of the total of spindles and looms offered for scrapping, well over 50% was already idle when the scheme was first announced earlier in the year. Further contraction cannot improve the labour problem and the Government must do all in its power to encourage new industry into the worst affected areas. Commenting on the applications received so far from firms deciding to scrap machinery, Lord Rochdale (chairman, Cotton Board) says: "The response to the cotton reorganisation schemes has proved very satisfactory. The machinery which will be scrapped will effect a realistic elimination of excess capacity in the industry and the way now appears clear for those who will remain in the industry to reorganise and re-equip themselves for the future."

A recent Board of Trade announcement states that arrangements can now be made to bring into force the second part of the reorganisation scheme. This concerns re-equipment and modernisation towards which grants at the rate of 25% will be paid as provided for in Section 2 of the Cotton Industry Act, 1959. The purpose of the grants is to assist the industry to use the opportunity offered by the elimination of excess capacity to carry out the re-equipment and modernisation which are necessary in order to achieve the highest possible level of competitive efficiency. They are not intended as a contribution to expenditure on repairs, maintenance and normal replacement, and applicants will have to satisfy the Cotton Board that their proposals are part of a scheme or schemes of re-equipment and modernisation.

Grants will be payable in respect of the cost to the applicant of the purchase and installation of new equipment used for or in connection with productive processes; *second-hand* items will not qualify. They will also be available for the modernisation of existing equipment. There will not be any condition as to the type or make of equipment which must be installed. Firms availing themselves of the scheme must incur the expenditure within the period April 24, 1959 and July 9, 1962 (i.e. within three years of the coming into force of the Act), and the equipment must be installed before July 9, 1964. Applications will only be entertained where the expenditure is at least £2,500.

Where the re-equipment is in replacement of machinery in respect of which compensation has been paid under a reorganisation scheme no grant will be paid until three-quarters of the compensation payments has been refunded in accordance with the provisions of the reorganisation scheme. Before grant is paid the firm concerned must have taken any necessary steps under the arrangements in force within the section for the payment of compensation in respect of loss of employment as a result of re-equipment or modernisation with the assistance of the Government grant. Entitlement to grant will be subject to strict compliance with all the conditions which the Board of Trade may from time to time require to be satisfied. A full statement about the conditions and the procedure to be followed in submitting applications is being prepared in consultation with the Cotton Board and will be issued shortly. The main categories of equipment which will qualify for grants are—

SPINNING MACHINERY: Ringframes, speedframes, drawframes, lap machinery, combers, cards, cotton room and blowing room equipment.

Ancillary Equipment: Bobbin strippers, winding, warping and beaming machines, travelling overhead cleaners and pneumatic underclearers, pneumatic waste or fly removal systems, mechanical roller pickers, yarn conditioning plant, testing equipment, electric motors and other power plant.

Accessories or Modifications: High draft systems, larger cans, new type bobbins or spindles, automatic knotters.

WEAVING MACHINERY: Looms, loom motions and attachments, tape sizing machines, warping and beaming machines, pirn winding machines, warp tying and drawing machines, warp pinning and leasing machines.

Ancillary Equipment: Pirn stripping machines, shuttle trimming machines, heald and reed cleaning machines, reed polishing machines, cloth cropping machines, testing equipment, electric motors and other power plant.

Accessories or Modifications: Warp stop motions, moisture control on tape sizing machines.

DOUBLING MACHINERY: Ring doubling frames and double-twist spindles.

Ancillary Equipment: Cone and cheese winders, automatic cone or cheese winders, clearer-winding frames, gassing frames, electric yarn singeing machines, warp

gassers, warping and beaming machines, reeling frames, yarn conditioning plant, testing equipment, electric motors and other power plant.

Air conditioning plant, air cleaning and ventilation plant, dust extraction plant, electrical installations, lifts and mechanical conveyors will also qualify for grant in appropriate cases.

THE MILAN EXHIBITION

RE-EQUIPMENT and modernisation are words of considerable prominence at present. The spreading of the textile industries throughout the world and the conversion of large consuming countries into producers has altered the whole pattern of world textile trade, increased the competition for markets which are continually restricting, and necessitated the installation of the latest machinery as the only means of economic survival. In countries, like Britain, the U.S.A. and certain European countries, automatic machinery is essential to combat labour shortages and increasing labour costs. By a strange coincidence to compensate, not for costly labour, but for lack of traditional skills, the same machinery provides the answer to the problems of those countries now embarking on textile production. There is, therefore, a world-wide demand for modern textile machinery which transfers the work load from the operative and removes, as far as automatic controls will permit, the necessity for skilled supervision and manual control. This demand was early foreseen by British textile machinery manufacturers and has resulted in a constant flow from British factories of precision-built machines specially designed to meet the specific requirements of this modern age.

At the International Textile Machinery Exhibition in Milanane, outstanding example of technical progress in cotton preparatory stages is to be seen in the "Clean-o-Matic" blowroom one exhibited by Tweedales and Smalley Ltd., Rochdale. The same firm exemplifies the modern trend towards increased productivity by shortened processing by exhibiting a new package-making drawframe and a short-length sliver ringframe. A new high-speed drawframe is also shown. Outstanding in the Platt range of spinning machinery on view is the new high-production tow-to-yarn ringframe for spinning continuous filament tow over a full cotton-count range. A new narrow ringframe embodying the features of the well-known MR3 frame and a light doubler of new design are also shown.

Product quality and regularity depend largely on the precision manufacture of machine components. Achievements in this respect are exemplified at Milan by such exhibits as the new GX2 drafting system of Casablancas High Draft Co. Ltd., Salford. Other exhibits of precision-manufactured parts are the spinning and twisting rings of Eadie Bros. and Co. Ltd., Manchester, and the range of card clothing displayed by English Card Clothing Co. Ltd., Huddersfield. Cleanliness in spinning is demonstrated by the new combined frame and ceiling cleaning unit shown by Parks-Cramer (Great Britain) Ltd.

Wool Spinning Machinery.—The self-cleaning washbowl with a pneumatic squeezing head which Taylor Wordsworth and Co. Ltd., Leeds, has many interesting features, such as the main bowl's double scrolls and twin automatic valves. Developments in blending plant is evident from the photographs shown by Spencer and Halstead Ltd., Ossett, and by the parts actually exhibited and which include the company's latest Votex oiling device. Developments in carding are demonstrated by the two-part woollen card set with MAF3 automatic feeder, straight-fibre broad-band intermediate feeder and four-height condenser, exhibited by Platt Bros. (Sales) Ltd. The two-bowl backwashing machine shown by Petrie and McNaught Ltd., Rochdale, has many interesting features. An outstanding development in textile processing is represented by the new three-operation system of worsted drawing with Ambler Super-draft spinning exhibited by Prince-Smith and Stells Ltd., Keighley.

Yarn Preparation Machinery.—The latest developments in cone and cheese winder design are to be found in the four machines shown by Thomas Holt Ltd., Rochdale, and modern developments in yarn preparation are illustrated by the products exhibited by the Scragg Group, Macclesfield. The latest developments in warping are represented by the cascade warper shown by F.N.F. Machinery Manufacturing Co. Ltd., Burton-on-Trent. One of the most impressive exhibits in the yarn preparation section will be the three-unit sizing machine to be shown by Joseph Hibbert and Co. Ltd., Darwen.

Weaving Machinery.—The Shirley loom, developed by the British Cotton Industry Research Association and built by Wilson and Longbottom Ltd., Barnsley, is basically an underpick, 2×1 box, fully automatic pirn-changing, dobby loom. Specially designed to weave fault-free fabrics from filament yarns. Several other fine British looms show the trend of modern development. British Northrop Ltd., Blackburn, will be showing four automatic looms from their wide range, and a high-speed automatic silk and rayon loom is one of the two shown by George Hattersley and Sons Ltd., Keighley. Equipped with a Fischer weft battery, the loom is operating at 200 p.p.m. A 4×4 pick-at-will jacquard loom for figured furnishings and brocades and a fully automatic pirn-changing loom for cotton fabrics comprise the exhibits of Butterworth and Dickinson Ltd., Burnley. Of the most modern type and embodying many refinements, the Hardakers-Hammers centre-shed jacquard for use with endless paper cards is shown in operation by John T. Hardaker Ltd., Bradford.

Carpet Machinery.—Visitors to the stand of British Tufting Machinery Ltd., London, will find much to interest them in the three machines which are to be exhibited. These are, respectively, a 35-in. high-density cut-pile machine working from a beam, a new model 120-in. tufting machine with fully automatic control, and a six-needle machine for the decoration of carpets and rugs. A new machine designed to produce pile fabrics in a single-stage process is the Paerse-Laing "Bartuft" machine which Radcliffe Engineering Cc., Radcliffe, exhibit. Those interested in developments iu the more conventional methods of manufacturing pile fabrics should not miss Wilson and Longbottom's stand. Here emphasis is being placed on the company's new range of carpet looms.

Dyeing and Finishing Machinery.—To represent its range of stainless steel equipment for the dyeing section, Longclose Engineering Co. Ltd., Leeds, has selected a universal high-temperature dyeing unit with a radial flow, ball top frame for exhibition. Modern printing machinery will be represented by Mather and Platt's six-colour machine with a new helical pitching device which eliminates box-wheels. With this machine, pattern register is obtained by the simple turning of a handwheel, without the printer having to leave the front of the machine.

A special vibrating mechanism is the outstanding feature of the open-width washing machine shown by Sir James Farmer Norton and Co. Ltd., Salford. A new design of vertical drying machine is shown by Mather and Platt Ltd. A six-cylinder machine, it is equipped with all-welded cylinders with stainless steel bodies, designed for pressures up to 60 lbs. per sq. in.

Yarn Count Control in Woollen Mule Spinning

Accurate results are claimed for the prototype of an ingenious small device designed to record the amount of slubbing delivered during a mule draw

By F. PERCIVAL*

IN the course of a programme of quality control a positive method of yarn count control has been developed. This method will eventually replace the present insensitive wrap reel method of estimating yarn count, in which any heaviness or lightness of the yarn so detected is used to indicate when a change in slubbing delivery is necessary. (This is the method of control most commonly used at present in the woollen industry.) The principle involved is simple proportion and consists of setting the mule so that the ratio between the length of slubbing delivered and the effective length of a mule draw is exactly the same as the ratio between condensed slubbing count and the count of the required yarn. Thus if this method is applied in spinning from slubbing which conforms to the count specified then the yarn so produced will be exactly on count.

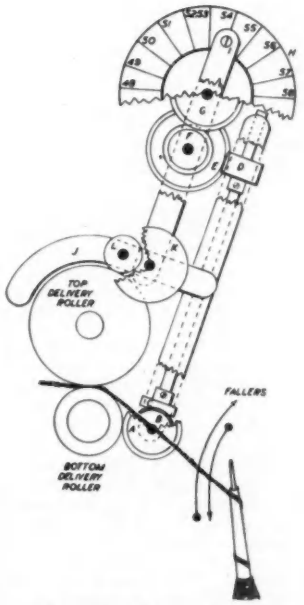

Fig. 1. Device for measuring slubbing delivery. (Normal working position)

Example

A 128 yds./oz. (8s Y.S.W.) weft yarn is to be spun on a mule with an effective draw of 72 ins. from slubbing which has been condensed to 96 yds./oz. (6s Y.S.W.). The ratio between condensed slubbing count and the count of the required yarn is as 96 is to 128 (as 6 is to 8) or simply 3 to 4. To obtain yarn of the desired count from the given slubbing we must arrange the ratio, therefore, between slubbing delivery and the effective mule draw must be arranged to be as 3 is to 4. The effective mule draw is 72 ins. and the ratio must be as 3 is to 4, therefore the slubbing delivery is obtained as follows:

Let x equal slubbing delivery in ins. Then as 3 is to 4 so x must be to 72

$$x = \frac{72 \times 3}{4} = 54 \text{ ins.}$$

The delivery of slubbing required in this case is 54 ins.

In this method the following facts and measurements must be known.

(1) Ratio between condensed slubbing count and required yarn count.
(2) Effective length of a mule draw.
(3) Amount of slubbing delivered during a mule draw.

Of these No. 1 is usually common production knowledge and No. 2 may be easily measured. No. 3, however, presents a real problem but it is one which has been successfully overcome by employing an ingenious little device constructed from "Meccano" parts.

Fig. 1 shows a side view of this interesting development in operating position, i.e., sitting on the top delivery roller of a mule so that the weight of the device firmly engages the measuring wheel A with the bottom delivery roller; thus when the delivery roller rotates the measuring wheel must also rotate. Any movement imparted to the measuring wheel is transmitted through gears BC, DE and FG to the dial H calibrated divisions 1 in. apart around the periphery. The parts J, K and L make the device stable in operation and yet allow the considerable adjustment necessary to facilitate its use on the various different types of mule delivery rollers. Fig. 2 is a view of the device from the front which, in use, is placed on the delivery rollers during

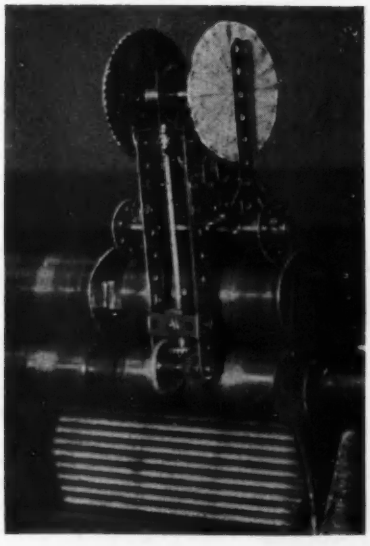

Fig. 2. Front view of the prototype constructed from "Meccano" parts

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the outward run of the carriage immediately after slubbing delivery has ceased. This may be at either left- or right-hand sides of the mule as there are two dials suitably calibrated for this purpose. The calibrated dial is adjusted so that the division marked zero can be seen at the centre of the aperture I. The device is now ready for recording the slubbing delivery on the next draw made by the mule. One revolution of the calibrated dial represents a delivery of 20 ins. of slubbing and the dial is therefore divided into twenty 1 in. units. As considerably more than 20 ins. of slubbing are delivered during normal spinning the dial has to be watched to determine how many complete revolutions are made, the part in excess of a complete revolution can then be read off at the aperture I. To obtain the number of inches delivered then the number of complete revolutions is multiplied by 20 (because 1 rev. = 20 ins. of slubbing delivered) and the number of inches indicated by the dial read off and added.

Example

The device was placed on a mule as previously described when the dial made two complete revolutions plus part of a revolution, this part was read off as 14 ins. Thus the delivery was $2 \times 20 + 14 = 54$ ins. In practice with a 72 ins. draw mule it has been found that between 41 to 60 ins. delivery cover almost all normal drafts. As a result of this experience the calibrated dial has been marked off in 1 in. divisions from 41 to 60 ins. then the number of complete revolutions need only be checked to see that two are made. The number of inches delivered can then be read off directly. However, this system will not work in every case and the first method suggested is the better for general use. Although the calibrated dial has to be watched to determine the number of complete revolutions made this has proved quite easy in practice as the dial revolves quite slowly: a red line marked on the zero division enables it to be followed without undue trouble.

The advantages to be gained from a positive yarn count control system as described are too numerous to mention here. However, the device has proved suitable for the following uses:—

(1) As a quick and accurate means of setting up a mule at the start of a blend.
(2) For controlling yarn count during spinning providing that, either the condensed slubbing count remains constant or, that the spinner is provided with a pattern of how the slubbing count has varied.
(3) As a convenient spot check for the Quality Control Department.

In its present form the device is light yet, fairly rigidly constructed, easily handled by foremen and operatives, and quite accurate in the information it provides. Some wear of the working parts has been experienced and whilst all parts are easily and cheaply replaced, improvements could no doubt be made if the device was constructed on a commercial basis by some instrument manufacturing firm.

Finally it is interesting to record that as a result of using this device other problems have been brought to light, e.g. variation from draw to draw in the amount of slubbing delivery, and variations in carriage travel from draw to draw.

Improved Wool Scouring Method

By J. GRINDROD

AN improved method of scouring raw wool has been developed in U.S. Department of Agriculture Research at Albany, California. It provides mild but effective cleaning, which avoids damage to the wool fibre and results in scouring wastes that can easily be treated to reduce water pollution. This new wool-scouring method was described recently by Mr. W. Fong, research chemist of the United States Department of Agriculture at a national convention of the American Association of Textile Chemists and Colourists in Chicago, Ill.

Mild or non-alkaline scouring conditions were important to protect wool-fibre quality, Mr. Fong said. In recent years, certain synthetic detergents (nonionic, ethylene-oxide types) had been used to scour wool. A disadvantage of these detergents was that they resulted in emulsions of grease and other contaminants that were difficult to separate by usual chemical methods. This made wool-scouring wastes a serious water-pollution problem at some scouring plants.

Mr. Fong's studies at the Agricultural Research Service (Western Utilisation Research and Development Division) in Albany have shown that other synthetic detergents (of the alkylolamide type) can be used effectively as wool-scouring agents. In addition, grease and dirt in washing solutions containing these detergents can be separated easily by cooling and acid treatment. This simplifies the problem of keeping the wastes from polluting streams.

In a technical discussion of the laboratory tests, Mr. Fong said acid treatment of wastes containing alkylolamide scouring agents resulted in virtually complete removal of wool grease (crude lanolin). Only 60% of the grease was removed by similar treatment of scouring wastes containing conventional ethyleneoxide detergents.

Tests with various types of alkylolamide detergents showed that those derived from lauric acid and diethanolamine were most effective, particularly products containing a high content of dihydroxyethyl lauramide. The alkylolamide detergents were derived from the reaction of fatty acids with alkylolamines. They were used commercially as foam stabilisers in synthetic detergent formulations and for other purposes.

Mr. Fong also reported studies on waste from the desuinting step in wool scouring. This step consisted of a preliminary washing in warm water to remove suint (dried perspiration of sheep) and other water-soluble contaminants, including a small amount of grease. Desuinting was done in most scouring plants that recovered grease as a by-product by centrifugation. In contrast to wastes from detergent scouring for grease removal, Mr. Fong said, wastes from desuiting were effectively clarified by treatment with bentonite without acidification. The work reported at Chicago is an extension of earlier investigations by Mr. Fong, which demonstrated the beneficial effect of bentonite in the removal of lanolin and other substances from scouring wastes by acid treatment.

Warner Medal

The Textile Institute has awarded the Warner Medal to Dr. Margaret Hannah, M.A., M.Sc., for outstanding work in textile science and technology. Dr. Hannah, until recently lecturer in textile engineering at Leeds University, is one of the country's best known textile technologists in connection with spinning and she will be presented with the medal at the annual convocation of the Institute on November 3.

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FIRE PROTECTION ASSOCIATION. The Fire Protection Association, 31-45 Gresham Street, London, E.C.2 has published the latest list of members. It shows clearly how the Association has expanded as the need for fire protection becomes apparent to a wider public. The Association's list of publications has also been revised. The list is divided into six main sections: building, electricity, industrial and commercial occupancies, chemical, fire extinguishment and agriculture and forestry. The list of members is available at 4s. but there is no charge for the list of publications.

Planning for the Future

Planning and doing are not separate jobs. They are, in fact, separate parts of the same job and no work can be carried out at maximum efficiency unless it contains elements of both

By F. H. DREWES

IT has been said that skill in planning not only enables a supervisor or an overseer to run his job but it also develops his ability to get results which will mean advancement for himself and helps him to make a major contribution to the successful operation of his department and company. Managers and overlookers are required to plan constantly. Every time work is assigned to employees, material requisitioned or a job order is initiated, some form of planning is required. This means that management and overlookers probably "plan" more times a day than any other group of executive people employed in the textile industry.

The kind of planning they most frequently do is one-time, on-the-spot planning. The results are normally evident within a matter of hours. On the other hand, the kind of planning skill which is most often neglected is that which deals with longer-term goals such as planning for cost improvement in specific areas like waste, labour efficiency and equipment maintenance. Also in planning for the retaining or developing needs of employees and changes in processes or quality techniques.

The writer, in endeavouring to "pin-point" planning requirements to overcome shortcomings, selected two reports in use at one of the larger mills in the U.S.A., namely a weekly raw inspection report and a weekly quality inspection report on finished cloth and analysed these reports for a limited period. First, on the raw inspection report the percentages were noted on the firsts including mendable seconds in relation to the total grey yards inspected on each style produced. Then, the percentage of non-mendable seconds to the total grey yards inspected on each style produced and finally the total grey yards put into finished production on each style.

Then turning to the weekly quality inspection report a similar comparison was made in percentages of firsts to total finished yards, percentage of seconds to total finished yards and then continuing further to analyse the percentages of remnants, allowances, and loss to total finished yards (by styles of finished cloth). Inasmuch as the total of the seconds appeared large and required analysis, it occurred to the writer that a definite need existed for a provision on the weekly quality inspection report to show in what department the seconds originated. Four classifications were headed up: (*a*) yarn, (*b*) weave, (*c*) dye and (*d*) finish. As the result of this analysis, it was possible within a very short period of time to "pin-point" the department or section responsible for the origination of seconds, and having available the individual style names and/or numbers, it was possible to check back to the particular shift, overseer, section hand and operator responsible for the large production of seconds.

A test was run over a two week's period on loom production between two operators on the same two pieces of equipment responsible for producing seconds. This test was made known to the operators concerned. With the close supervision of all concerned, a much better production performance resulted. Therefore, thanks to this specific example of long-range planning, a much needed improvement resulted. Only through proper co-ordination and schedule actions could such satisfactory results be achieved. There was room for improvement and the proper efforts were expended to take action. Actually, it was proper planning based on the most practical down-to-earth facts about the past and present, with carefully thought-out estimates of the future production of this single style cloth which accomplished the desired results.

One Consolidated Report

The outgrowth of the planning for the analysis and test conducted resulted in the scrapping of both weekly raw inspection and weekly quality inspection reports as separate reports and in place of two reports being issued, the best features of both were incorporated into one consolidated report called "Weekly Raw Inspection and Quality Report" (Fig. 1). Into this

NEISLER MILLS

WEEKLY RAW INSPECTION AND QUALITY REPORT WEEK ENDING _____

STYLE PRODUCED BY: _____	RAW INSPECTION					GREY YDS. PUT INTO FINISH	FINISHED CLOTH														REMARKS
	TOTAL GREY YDS. INSPEC (COL. 1)	FIRSTS INCLUDE MENDABLE 2NDS.	% OF TOTAL IN COL. 1	NON MEND ABLE 2NDS.	% OF TOTAL IN COL. 1		TOTAL FINISH YDS COL. 2	FIRSTS	% OF TOTAL IN COL. 2	2 NDS.	% OF TOTAL IN COL. 2	ANALYSIS ON 2 NDS. ORIGINATING IN DEPT.				REM	% OF TOT. IN COL. 2	ALL	% OF TOT. IN COL. 2	LOSS	% OF TOT. IN COL. 2	
												YARN	WEAVE	DYE	FINISH						

Fig. 1. The "Weekly Raw Inspection and Quality Report" combines the best features of both previous inspection reports

report was added an "Analysis on Seconds" under the section "Finished Cloth." The writer maintains that such planning and analysis as outlined above could have originated with the superintendent or supervisor in charge of inspection in place of top management having to note and call attention to the need of such an analysis.

The development of skill in planning requires the full utilisation of certain skills, and to practise them. Planning is not just a mental or paperwork exercise. There must be an end to be achieved, a problem to overcome or a project to be accomplished. In fact, most successful planning starts with performance which requires improvement in a particular area, as illustrated above in the determination of where and who is responsible for the large percentage of seconds detailed in the inspection report.

The biggest problem should be selected in one's department. It might be a cost problem, or a human relations problem, or a quality problem. When a pressing problem has been selected, and the desired results determined, the important planning objectives are set. Fundamentally, planning is thinking ahead, therefore, sound judgment is required to estimate what the "future facts" will be. A plan can only be devised when future requirements are known, and future events are forecast.

Forecasting ability can be improved by practise. Each month, for example, it is well to check the actual facts against the forecast. The plan should take the form which fits the need. For instance, a simple plan might be a listing of the things to be accomplished. A more complicated plan might include a detailed analysis of figures. A plan should only be detailed for the length of time that the future is reasonably predictable. Above all, any plan should include specific target dates for accomplishment.

With these facts in mind—determine (in the case of where a department is presently spending more than the budget permits)—

(1) Specific causes for the overage.

(2) Steps needed to remove each cause.

(3) People who must be called upon for action.

(4) Specific target dates for each action.

(5) Organising these factors to result in an effective plan.

Mill Balance

As a concrete example of the operation of practice technique to bring about the solution of a problem, this writer in an effort to control raw materials, prepared a five-column sheet. In the first column was listed the steps to be taken in the plan. In the second, a list of the material reported purchased over a month. In the third, a list of the materials (yarns) reported consumed. In the fourth, the running inventory or "control figures" on raw materials for one month, by weeks; and in the fifth column was indicated the people who should be included in the planning operation itself—in this case it was inventory control personnel.

The plan or problem was to determine why the balance on hand in raw materials continued to reflect an upward trend or increase in money value with production of manufactured yarn and finished cloth remaining constant. The planning was further complicated in that two mills were involved, that is to say, the purchasing for both mills was centred in one purchasing department and in one individual. He was positive in making the statement that his weekly report of purchases to the writer reflected the total purchases for both mills.

The material lists in columns two, three and four were double-checked and found to be correct—so far as reported. The stock clerks were positive that all materials were distributed to the proper mills for whom ordered. The receiving records confirmed this. Production costs were then checked and no unusual increase or decrease noted.

It then occurred to the writer to check the report of materials (yarns) reported consumed with the clerk who prepared this weekly report. Here it was discovered that the report submitted to the writer covered the consumption at one mill only, with the second or outlying mill preparing it's own report as the raw material was put into process. A copy of this report never reached the writer and this mill, operating on a smaller scale or production basis, and often on a curtailed operation schedule, had been directing its reports to the cost department which utilises same in preparing its cost analysis. In so far as the writer was concerned, material was being consumed and never reported as such, resulting in an accumulated raw material inventory and growing larger from week to week, thereby presenting an incorrect status on raw materials in the overall status of both mills. Without a definite planning project, this condition could not have been corrected without untold difficulty since the outlying plant and its records were not easily accessible and might have forced the writer to extend his analysis and delayed his adjusting entry to correct the condition uncovered.

From the foregoing example, it is obvious that planning is a difficult skill. It is made tougher yet, because of the limited time we all have, to do a proper planning job. We are all so absorbed in our day-to-day routines and working under pressure that we are prone to feel that the job is getting done when in reality, we are not getting our job done thoroughly or accurately or economically, in some cases. To overcome this, it is suggested that a "planning for tomorrow" system be laid out. First, with pencil and paper, list all things which have to be done, say every day. Next, indicate beside these items the time of day each could be done. Finally, decide to list on the day before, all special items which have to be done "tomorrow."

This plan should work. First, by sticking to the schedule. Second, acting by consistency and perseverance even if necessary to make a few revisions in order to accomplish more by completing certain tasks at certain times. It is a fact that planning and doing are separate parts of the same job; they are not separate jobs. There is no work that can be performed effectively unless it contains elements of both.

The development of skill in planning is a great challenge to every supervisor or overseer because nothing is quite so gratifying as to see one's plan or problem carried to a successful conclusion. Nothing is more stimulating than planning into an unknown or uncertain future. There is no more important qualification for reaching higher management levels than the ability to plan efficiently.

Worsted Spinners New President

Mr. F. T. Sobey (chairman and managing director, E. Wadsworth and Son Ltd., worsted spinners, Cleckheaton) has been elected president of the Worsted Spinners' Federation in succession to Mr. M. W. Shelton. The new senior vice-president is Mr. J. M. Horsfall (managing director, J. C. Horsfall and Sons Ltd., Glusburn) and junior vice-president, Mr. B. Turner (managing director, Benson Turner and Son Ltd., Bradford).

Milan: International Textile Machinery Exhibition

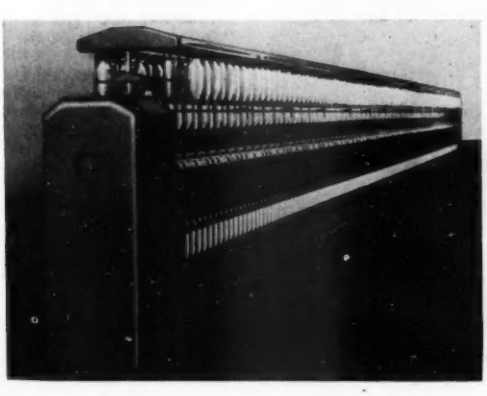
The recent printing trade dispute has made it impossible to mention in one issue all the exhibits at this third international textile machinery exhibition. Features of some of the machines, etc., on view are dealt with briefly on the following pages and September "T.M." will devote more space to other specialities displayed during this event. In addition, a "T.M." representative will also give his impressions after visiting the exhibition

On **Stand No. 7116 - 7126, Platt Bros. (Sales) Ltd.** show their latest cotton card, equipped with "Crosrol" web purifier and Universal coiler. The web purifier is designed to pulverise all particles of trash in the web and the coiler is available for cans 16 and 18 ins. dia. The "Granular" card on view incorporates a new principle of carding and is fitted with a two-can changing coiler with swivelling head controlled by measured length. The flats are replaced by concentric covers, specially prepared on the inner surface, and a pre-opening roller which operates over the taker-in and is set to the taker-in and the cylinder.

The MDF.5 high-speed drawframe is outstanding for high productions, sliver regularity, ease of operation and maintenance. The machine occupies a minimum of floor space and is 18 ins. gauge. Various drafting systems are available, based on 3 lines of bottom rollers. Pneumatic system of waste removal caters for fly and waste extraction. Spring-loaded, over-arm weighting to top rollers is standard. The 6-head "Hartford" high-production comber will give an output of up to 44 lbs. per hour. Laps of 20 to 40 dwt. may be processed and slivers of 40 to 60 grs./yd. produced with either bi-coiling or twin-can coiling. The machine exhibited is fitted with twin coiler and is an alternative to the bi-coiler. For a given can size, this approximately doubles the running time between doffings at the comber, also the amount in the drawframe creel. The twin coiler is available for can sizes 14 and 16 ins. dia.

The MS.2 speed frame is a slubber producing 12×7 ins. bobbins containing up to 65 ozs. of roving with normal winding and up to 80 ozs. with high tension winding. Increased spindle speeds—up to 730 r.p.m. for this size of package—can be obtained readily. The machine is equipped with "Arro" flyers which have a considerably improved finish, particularly on the inside of the hollow leg, obtained by electrolytic polishing. Latest features include front and back stop motions, automatic flyer positioning device and a novel 3-over-3 drafting system. Motor drive includes electro-magnetic clutch.

The MR.3 ringframe, incorporating many refinements and improvements, is available in lifts from 6 to 12 ins. and a wide range of drafting systems can be applied; the "SpinSaVac" system of broken end collection is an integral part of the machine. The frame can be fitted with a cop, roving, combined or triple building motion as required. Platt "anti-wedge" rings with elliptical type travellers allow higher spindle speeds to be obtained. Developed from the MR.3—the narrow MR.4 ringframe—offers more overall advantages within considerably less space . . . within a framing 28 ins. wide. It is an all-count, general purpose, high efficiency machine with excellent performance both in production and quality. Roller stand angle is standardised at 45° and improved spinning conditions provide more favourable spinning angles. Various drafting systems can be applied.



The new MR.4 narrow ringframe is claimed to be an all count, general purpose high efficiency machine. (Platt Bros. (Sales) Ltd.)

The new MD.3 ring doubler shows high promise of improved performance on all types of yarns. Interchangeability of many parts with those of the MR.4 permits stocks of spare parts to be reduced and gear change points are such that adjustments can be easily effected. The machine has one line of top and bottom rollers, suitable for either wet or dry doubling and can be supplied in lifts 8 to 12 ins. and ring sizes 1¾ to 3½ ins.

Unexcelled for high productivity, manufacturing excellence and the latest demands of technological practice, the new Platt/Josephy card sets embody the most advanced systems of driving by side shaft, with variators allowing speed adjustments whilst the set is in operation. Built with varying numbers of cylinders, card sets are available to handle specified ranges of materials in widths of 1,525 mm. - 1,800 mm. and 2,000 mm. (60 - 72 - 78¾ ins.).

* * *

The "Matador" automatic reed cleaning and grinding machine shown on **Stand No. 6318** by **Max Spaleck G.m.b.H., Bocholt, Westf., Germany,** is designed to both brush and grind simultaneously, if desired. One feature among many is the positive and automatic adjustment of the grinding stones according to wear and tear. All bearings of the grinding device are protected from corrosion and dirt, and the table traverse is fully automatic. Once the reed is set up the machine traverses the full length of the reed intermittently. All setting is easy and rapid. The firm's "ES" dropper cleaning machine has five barrels which, when loaded with droppers and a polishing medium, are given a revolving and reeling motion. This removes the rust, dirt, etc., and 2,000 to 5,000 droppers can be treated at once. Another speciality, the Type "C" shuttle truing machine is a neat compact device for adjusting or repairing damaged shuttles. (Macart Textiles (Bradford) Ltd., 108 - 109 Swan Arcade, Bradford, are the U.K. agents.)

* * *

Equipment manufactured by **Parks Cramer (Gt. Britain) Ltd., Oldham**—a subsidiary of the Stone-Platt Industries Ltd. Group—will be shown on **Platt Bros. (Sales) Ltd., Stand Nos. 7116 - 7126.** New ringframes equipped with "Spin-SaVac" suction underclearers are on view. This is the first time this American development has been shown since manufacture in Europe commenced. A CTG

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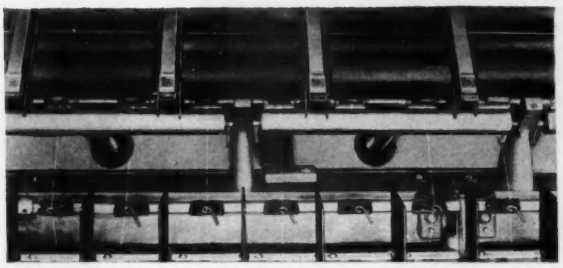
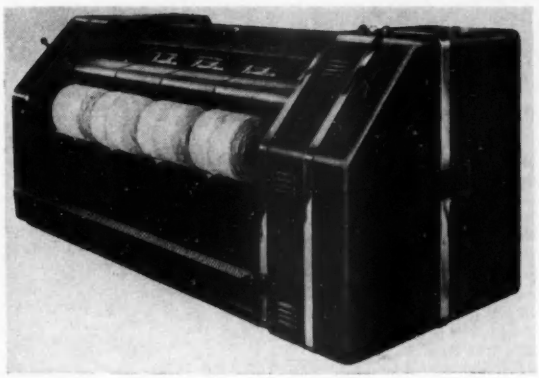
2 h.p. combined frame and ceiling cleaner unit will also operate over one of these machines. The worsted model of the "SpinSaVac" suction underclearer will be incorporated in the "Megaflex" ring spinning frame shown by **Prince-Smith and Stells Ltd., Keighley,** on **Stand No. 7117.** A "SpinSaVac" suction underclearer unit and a CTF 5B 1 h.p. frame cleaner will be fitted to **Tweedales and Smalley Ltd.** narrow pattern sliver-to-yarn ring spinning frame shown on **Stand Nos. 7114 - 7128.**

* * *

The completely new range of up-to-date textile machinery displayed by **Tweedales and Smalley Ltd., Castleton,** will arouse considerable interest. Following its success at last year's Manchester exhibition, the basic "Clean-O-Matic" blowroom line, comprising the "Tweedales-Shirley" hopper/opener, the "Shirley" opener, the reserve feeder, and scutcher with automatic lap doffer, is again on view. Sliver-to-yarn spinning will be an important feature of the stand. This consists of the A.K.P.12 package-making drawing frame and a short length sliver ringframe. Another recent development exhibited is the A.12 high-speed drawing frame.



Close-up of Parks-Cramer "SpinSaVac" suction underclearers



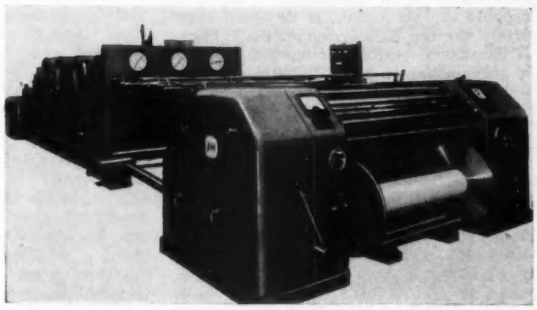
(left) A.K.P.12 package making drawframe. (Tweedales and Smalley Ltd.)

* * *

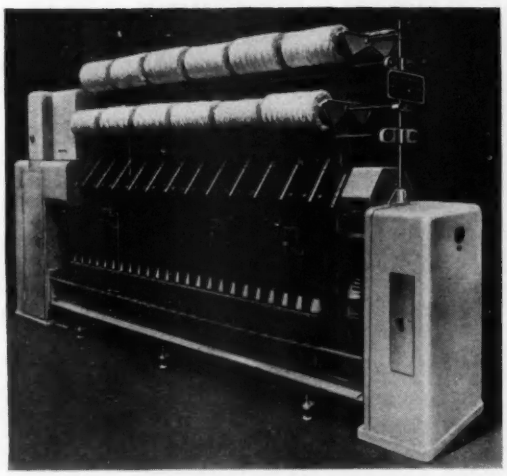
A new sizing unit will be shown by **Joseph Hibbert and Co. Ltd.** on **Stand No. 7125-7127.** The attractive functional design of this unit, its simplicity of operation, ease of maintenance and high production potential will convincingly demonstrate that Hibberts have introduced the "simplicity sizing" factor most successfully into their flexible system of sizing. Practical mill trials and tests have already proved the operational efficiency of this unit. The new sizing unit exhibited comprises: Model A.4 headstock, 28 ins. dia. beam; multi-can dryer, 63 ins. on face of can; size applicator, 56 ins. double roller. The A.4 headstock incorporates a patented mechanical drive which provides a constant predetermined tension throughout the build-up of the beam. The drive can be adjusted readily to any predetermined tension, dependent on the number of ends and count, and can operate over a ratio of bare barrel diameter to full diameter of up to 1 : 5·5. It can be supplied to work with bare barrel diameters from 4 to 5, 5 to 6 ins., etc. The only electrical equipment is a simple a.c. squirrel-cage type motor and associated control gear. A hydraulic variable speed gear provides any winding speed within the range of 0 - 100 yds./min.

This year is the 125th anniversary of the foundation of **Sulzer Bros. Ltd., Winterthur, Switzerland,** and on **Stand 6051 - 6072** the company show a four-colour machine, Type 85 VS 10 E. Its working width amounts to 216 cm. (85 ins.), and weft repeats of up to 8 picks can be woven by means of 10 shafts controlled by cams. The weft insertion using gripper shuttles enables colour-changing to be effected in very simple fashion. A turret-type changer transfers the appropriate weft thread to the shuttle as required. The changer is controlled by a cam chain with a repeat of up to 200 picks. This repeat can be extended to 400 or 800 picks by two-or fourfold repetition of the same weft colour; any colour sequence can be selected, including pick-and-pick.

The single-colour model 85 ES 10 E 140° with a working width of 216 cm. deserves attention on account of its high speed of 280 p.p.m. maximum. It is also equipped with 10 cam-operated shafts, and is particularly suitable for the production of



(right) Overall view of the new type Hibbert sizing unit



Short length sliver to yarn ringframe. (Tweedales and Smalley Ltd.)

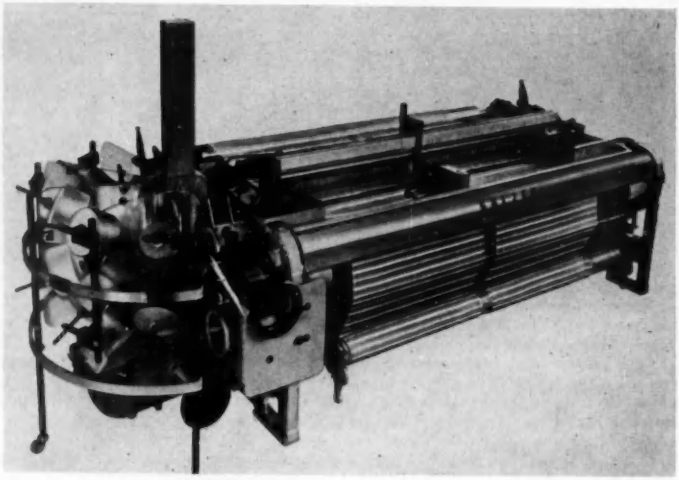
cotton and rayon fabrics in widths of 63 to 85 ins. Mainly coloured cotton fabrics are woven with the two-colour machine 130 ZS 10 E. The working width is 330 cm. (130 ins.) and the maximum weft thread insertion rate amounts to 722 yds./min. Sulzer weaving machines are also suitable for fitting dobbies. A single-colour machine, 130 ins. (330 cm.) wide, is displayed with a Staubli dobby for 18 shafts. This combination, designated 130 ES 18 K, is intended primarily for weaving cotton and synthetic fibres; it also is able to weave multiple widths of cloth.

* * *

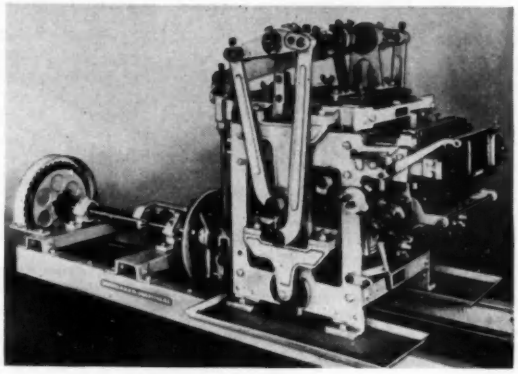
The new Hardaker-Hammers centre shed verdol pitch jacquard for endless-paper cards will be exhibited by **John T. Hardaker Ltd.,** is mounted over a Butterworth and Dickinson loom weaving jacquard figured nylon. Capable of working at 150 p.p.m., the machine is of the most modern type and includes many refinements. When possible parts are fabricated to eliminate the use of castings. Needle guides and cylinder bearings are brass, and main bearings are fitted with ball races. The machine exhibited is actuated by precision chain drive, but alternatively the drive can be through bevel wheels and vertical shaft. Movement of top griffe and bottom board can be adjusted by altering the throw of the sweep plate or moving the studs in a double-ended rocking lever. The two blocks are made adjustable for tilt to give perfect shedding and the mechanism is outside the main frame. A new Hardaker-Hammers double-lift verdol pitch jacquard displayed, capable of 190 p.p.m., is designed specifically for the high-speed modern looms. A Hardaker Axminster carpet jacquard is also on show.

* * *

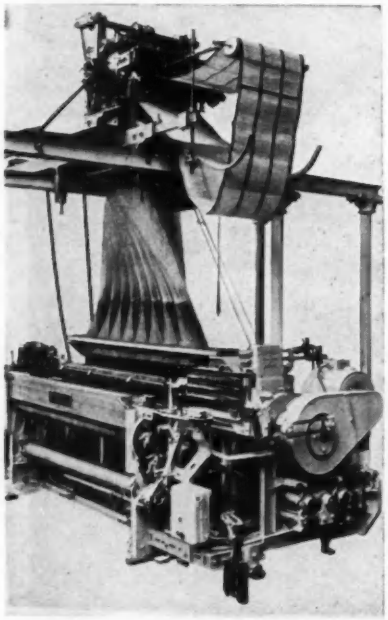
The company's "Easy-to-Work" high temperature pressure dyeing machine was shown by **Longclose Engineering Co. Ltd., Leeds 11,** on **Stand No. 7117.** This machine, of stainless steel construction throughout, is fitted with the quick-acting pressure cover accurately counterbalanced and opened and closed by turning one handwheel only. A sample dyeing unit is also fitted having a capacity of approximately 1 lb. The material in this unit is subjected to the same flow and pressure conditions as in the main dyeing chamber, so that the results obtained in the unit reproduce those of the bulk dyeing. A full capacity liquor reserve tank is fitted to the machine.



(above) The Sulzer type 85 VS. 10 E four-colour machine of 85 ins. width



Hardaker-Hammers centre shed verdol pitch jacquard for endless paper cards



Hardaker endless paper card jacquard mounted over a Butterworth and Dickinson loom

On show with this machine was a radial flow slubbing dyeing frame for ball tops, bump tops or slubbing in reeled hanks. The four vertical perforated spindles on this frame are complete with Longclose quick-acting follow down caps, to take up the compression of the material during dyeing. This avoids channelling and felting of the material. Alternative material carriers accommodate loose material, textured filament yarn packages and other yarns in packages, warps or hanks.

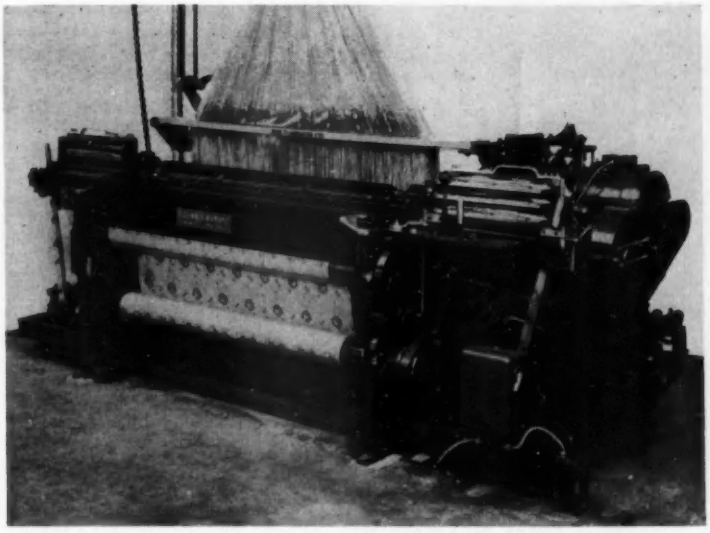
* * *

N. Schlumberger and Cie., Cuebwiller, Ht. Rhin, France, show machinery of the most advanced design for worsted (French system) and man-made fibres on **Stand Nos. 7094 - 7101.** Visitors will see a small complete production unit for wool combing, comprising: an intersecting gillbox before combing, a combing machine; a first intersecting gillbox after combing, with can delivery; a finisher with ball delivery and with auto-doffing for the balls; a melangeuse (for blending), followed by a drawing set and spinning frame for worsted and man-made fibres. This last will comprise a high-draft drawing frame equipped with a rubbing device, and a new high-draft spinning frame. Flax spinners will be interested in the flax tow comber. (N. R. Carter and Son Ltd., Saxone House, Donegall Place, Belfast, are sole representatives in Great Britain and Ireland.)

* * *

Butterworth and Dickinson Ltd., Globe Works, Burnley, England, show two looms on **Stand No. 6047.**

The 4×4 "pick-at-will" loom has been designed with special emphasis on furnishing fabrics. A large shuttle is capable of weaving with filament yarns or the coarser yarns in the form of a hollow cop. Of special interest is the method of pick selection; the pick is prevented from taking place unless an empty box is available.



Overall view of 4×4 "pick-at-will" looms (Butterworth and Dickinson Ltd.)

The "Knotex" warp tying machine

In the fully automatic pirn change loom for cotton fabrics, the makers have approached low weaving costs from three points of view:—

Efficiency.—Maximum efficiency means the looms must be kept running. Breakage of some small component can cause a loom to be stopped. Therefore, Butterworth and Dickinson have paid attention to such components as, for example, high tensile steel bolts and lock nuts.

Ease of operation.—There is a minimum number of parts and the number of points of adjustment has been reduced.

Price.—Standard components and modern production methods enables the loom to be offered at an attractive price.

* * *

On **Stand No. 7441, Dronsfield Brothers Ltd., Atlas Works, Oldham, Lancs.,** exhibit machines from the firm's normal production. These included the grinding machine No. 218 for grinding spinning rollers covered with leather, cork, rubber or any synthetic material, also the grinding machine No. 270 with hydraulic traverse, suitable in addition to grinding cotton spinning rollers, for larger diameter spinning rollers up to 6 ins. dia. The firm's pushing-on machine No. 227 for mounting rubber and other synthetic cots on all types of spinning rollers was displayed, also their latest type flat grinding machine and the card bend grinding machine No. 260.

Machine No. 163 for dressing, re-covering, grinding and burnishing licker-in rollers was shown, and the flat end milling machine No. 213 for re-bevelling the ends of flats. Other specialities included the card roller mounting machine No. 61, a motorised traverse wheel grinder No. 120, a motorised stripping attachment, a roller tester No. 236, and a knife grinding machine No. 510.

* * *

"Knotex"-maschinenbau G.m.b.H., Augsburg, Germany, are manufacturing a universal warp tying machine, which will tie in four different ways; unleased warps—both warps from lease—the old warp from the lease and the new warp unleased—the old warp unleased and the new warp from the lease. The machine will tie yarns made from almost any fibre, including silk, filament and spun rayons, wool, cotton and linen, nylon and perlon, tying the entire width in one continuous process. It has a wide range of yarn counts. The machine is driven by a built-in motor, which with the tying apparatus, is almost completely enclosed. The machine's efficiency rises with the thickness of the yarn, reaching 400 knots per min., or 24,000 knots per hour. (A. E. Aspinall Ltd., Manchester, are the agents for Gt. Britain and Eire.)

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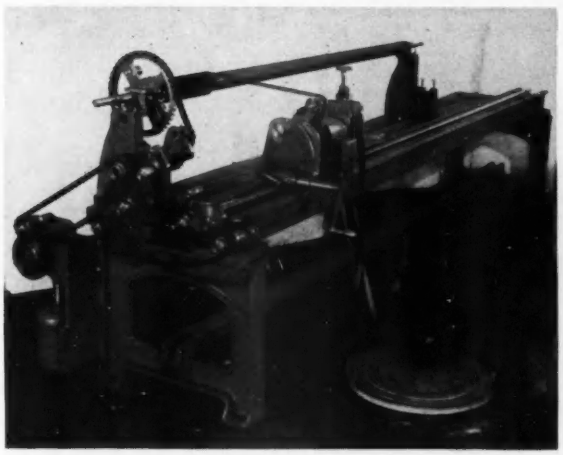
New conceptions of their multi-machine units were exhibited by **Tomlinsons (Rochdale) Ltd., Oldham Road, Rochdale.** In vertical tandem with the "Auto Zero" wire card raising machine—now fitted with the "Raisegauge"—is a super metazel revolving teazle raising machine fitted with patented teazle angle variator. On the former, the "Auto Zero" mechanism is further augmented by the "Raisegauge" which accurately measures the amount of raising energy absorbed by the card wires. On the latter the patented angle variator, plus the electronic modulating controls, permits the degree of raising energy to be increased or reduced at will and the necessity of carefully preselecting the permanent angle of teazle inclination is now entirely eliminated.

* * *

Societe Alsacienne de Constructions Mecaniques, Mulhouse, France, manufacture complete lines of machines for combing, drawing and spinning worsted and long staple man-made fibres, flax tow combing, and from blow-room to spinning and weaving of cotton and short-staple fibres as well as printing, bleaching, dyeing and finishing cotton cloth. On **Stands Nos. 7097 and 7098** the machines displayed include the "Perl" high-speed comber for worsted and long staple spinning. It is a high production machine designed to run at 170 nips/min. without vibration which, it is claimed, gives a 25% higher output for the same quality of top. A built-in exhaust fan gives a cleaner top and better quality noil.



Card roller mounting machine No. 61 shown with raising roller in position. (Dronsfield Bros. Ltd.)

The "IR" speed drafter is distinguished by a standard central part which includes the head and the driving parts and to which can be connected at will any one of three feeding systems (bobbins, cans) and eight delivery arrangements (1 or 2 cans single end, 2 cans double ends, of 16 or 24 ins. dia., 36 or 48 ins. high, 1 or 2 bobbins single end). The bobbin deliveries are more recent: they give, according to the type, 1 or 2 bobbins up to 24 ins. dia. Two balancing arms avoid long-wave unevenness, one large driving roller avoids crushing. The bobbin does not move laterally. An upright false twist funnel and a tension compensator give a perfect shape to the bobbin. A pedal frees the bobbin when doffing, another puts the device in starting position again. The sliver hydroregulator, which is used in the last finishing operation of combing sets or on the first preparer fits without difficulty between the central part and the feeding arrangement of "IR" speed drafters. It acts on the feeding speed and therefore on the draft ratio; thus the machine runs always at its optimum speed.

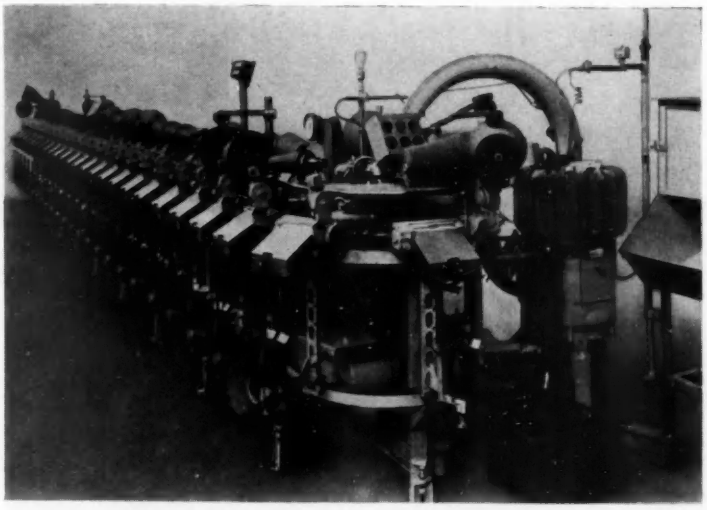
The cone gill reducer and the cone finisher frame are the heart of SACM "Versatil" system which will spin the finest counts whether of worsted, man-made staple fibres, goat hair, ramie or any combination thereof or wool/cotton mixture. Two operations on "IR" speed drafter, then the 3rd and 4th operations on the cone gill reducer and the cone finisher and the slivers are ready for spinning.

In the "CFL" ringframe the motors fit in the central part of the machine in order to provide easy access to the headstock. This arrangement also reduces the loss of suction power of the broken-end suction device, also the problem of torsion in long cylinders. Other features include quick methods for gear changing, and the direction and amount of twist, improved spinning motions, and an automatic under-winding motion.

The "ER" drawframe exhibited has two heads only, but runs at 400 ft./min. The two heads provide a machine which is easy to handle and feeding from out-size cans means less piecings. All parts have been designed for easy access. The drafting device has a fluted front roller of 60 mm. (2⅜ ins.) and an adjustable high-pressure device. It will accept any fibre up to 80 mm. (3⅛ ins.); setting is easy.

The new "Supergross" slubbing frame builds bobbins with a lift of 300 mm. (12 ins.) and a diameter of 165 mm. (6½ ins.), i.e. 1,500 to 1,800 kg. (3 to 4 lbs.) per bobbin. The "3 over 4" drafting arrangement with central top weighing arm fastened in front allows a heavy weight if necessary. Two types are available: horizontal drafting for fibres up to 60 mm. (2⅜ ins.), drafting inclined to 15° for fibres up to 80 mm. (3⅛ ins.). All top rollers are fitted with ball bearings. This machine is totally enclosed.

The "CFC" ringframe exhibited permits extremely high speeds due to a special arrangement of anti-ballooning rings. The L.B.R. drafting with top apron is fitted with the S.A.C.M. weighing arm. Available for fibres up to 60 mm. (2⅜ ins.) or up to 80 mm. (3⅛ ins.) it allows high drafts with excellent yarn evenness.



New automatic high-speed winder (S.A.C.M.)

Other specialities on view are a new automatic high-speed winder with travelling heads and a stationary knotting station; also the BH-32 thread-guide winder coupled with the BH-33 doubler, and the BH-11 high-speed winder.

S.A.C.M. will also exhibit a new loom, machines for cloth finishing, a self-acting screen printing carriage and a roller printing machine. (Sole agents in the U.K. and Eire are Macart Textiles (Machinery) Ltd., Swan Arcade, Bradford.)

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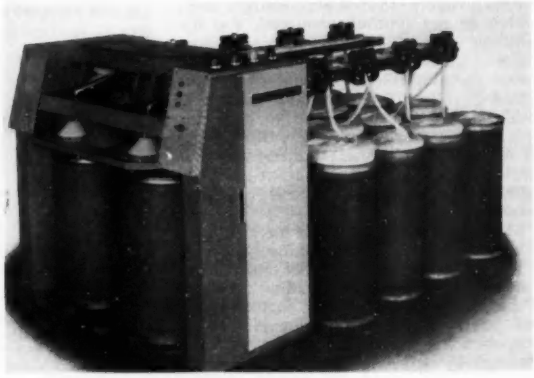
The range of equipment exhibited by **Gilbos s.p.r.l., Ateliers de Construction, Alost, Belgium,** on **Stand No. 5022,** includes the high-speed Type RCN cone winder for all spun yarns, winding hosiery cones 9° 15′. The machine will be fitted with Uster, Sigel and electronic yarn clearers, adjustable cop-holders, speed variators, suitable for winding at speeds up to 1,100 yds./min. The new high speed

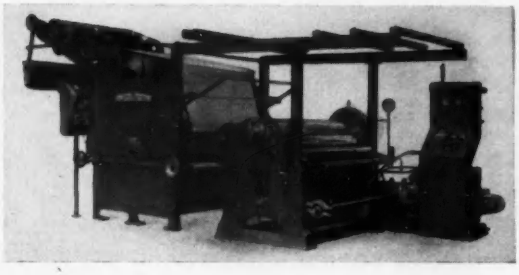


(above) The S.A.C.M. "ER. drawframe

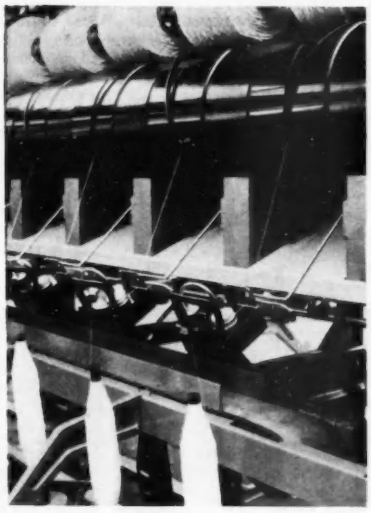
(left) High-speed PERL comber can be supplied with larger cans and different feed arrangements. (S.A.C.M.)

Type TS-Unitrom winder for warping and dyeing packages, on view for the first time, is fitted with large grooved drums (10¼ ins. dia.) and winds at up to 1,650 yds./min. The TS-Unitrom is available with a 5 or 6 ins. traverse and is fitted with hydraulic dampers, speed variators, adjustable cop-holders and other interesting developments.

The well-known Type UC hank to cone winder for all spun yarns, will be shown with the newly developed power-driven waxing arrangement, also available for existing machines. The Type UC-S muff to cone winder, will be shown winding stretch yarns on to cones 5° 57′ at high speed. The machine is complete with yarn delivery device and special oiling arrangement. The Rolls 10 winder produces rolls 10 ins. traverse × 10 ins. dia. as well as packages with a shorter traverse. This machine is widely used for the production of flax, hemp, jute, cotton, rayon, wool and carpet yarns on cheeses and cones up to 4° 30′. The Type R high speed carpet yarn winder shown produces cheeses and cones up to 4° 30′, with a 6 ins. traverse, and the yarn is delivered from large hanks or skeins. Package diameter is up to 10¼ ins. (Agents in the U.K. and Ireland, Robert S. Maynard, Langham Court, Fielden Park, Manchester 20.)



The "Evaset" shrinking machine. (Hunt and Moscrop Ltd.)



Type T.S. Unitrom winder for warping and dyeing packages. (Gibos)

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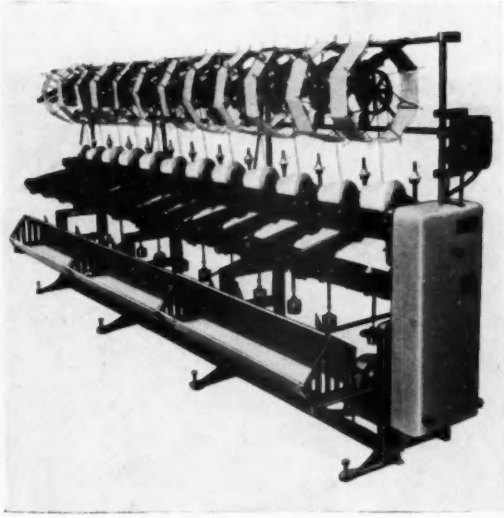
Two new developments shown by **Hunt and Moscrop Ltd., Middleton, Lancs.,** on **Stand No. 1070,** include the patent "Mist" hydro-conditioning machine incorporating the latest features in conditioning techniques for the even and accurate application of moisture to cotton, rayon, linen, flax and other woven materials. The damping unit can be electronically controlled to give a pre-set degree of saturation on both sides of the cloth simultaneously or, if required, to one side only. The machine is ideal for giving the correct conditioning of cloth before shrinking and is recommended in conjunction with the "Evaset" rubber band compressive shrinking machine. This unit is suitable for processing cotton, linen, spun rayon or mixture piece goods requiring shrinkages of up to 16%. The "Evaset" shrinking process—entirely mechanical—can provide a wide range of finishes from a firm handle to a soft full handle. Shrinkage is obtained by the utilisation of the expanding and contracting surface of a rubber sleeve, pressure to the roller being applied by a special self-sustaining high-speed oil pump. The machine is driven by a variable speed motor.

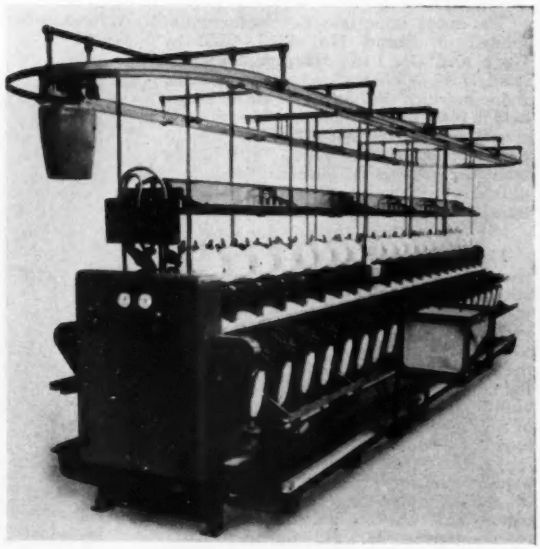
* * *

Features in the screen printing machine demonstrated by **Gebr. Stork Apparatenfabrick N.V., Amsterdam,** include a new cloth feeding arrangement in which constant tension of the cloth is realised in a simple way. In addition, the screen adjusting blocks enable more rapid adjustment and a repeat control device prevents inaccuracy of the repeat. A new type of spiral drier, has been designed in order to print light cloth without difficulties.

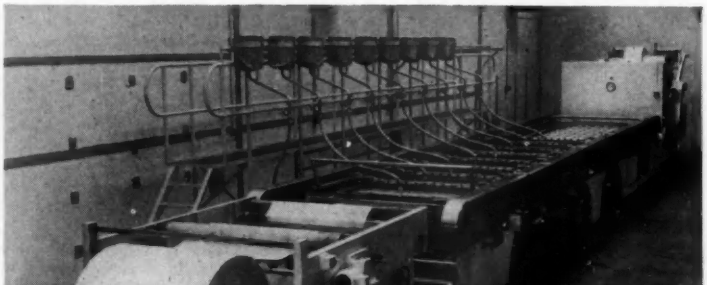
The firm's complete open width bleaching range with washing machine works on the principle of reaction chambers, in which rollers with 10,000 m. of cloth (1,800 mm. dia.) slowly rotate. In the saturating compartment the cloth is completely impregnated. The membrane



Gilbos type UC hank to cone winder with patent disentanglement stop motion



Gilbos high-speed type BCW cone and cheese winder for all types of spun yarns



The new screen printer shown by Gebr. Stork Apperatenfabrik

Sam Vollenweider Ltd., Horgen, Switzerland, show on **Stand No. 1022** a new cropping and shearing machine, the "Super-Duplo" a modern machine with improved appearance and stability. Working single width only a production of 40,000 meters can be achieved in one shift. In addition, Vollenweider exhibit the "Imperial" fully automatic selvedge trimming machine, which is suitable for all sorts of weft-check cloth of cotton, wool, linen, silk and synthetics. The loop-opener is based on an entirely new principle and a vertically rotating spiral cutter is used for cutting off the opened loops. This results in a more evenly trimmed selvedge. Automatically guided loop-opener and cutter. Automatic guiding of the seam-let-through device.

The "Peerless" cloth shearing machine on view differs from conventional models. Two cutters placed vertically one above the other have been introduced in recent years not only in Europe but also in the U.S.A. The "Peerless" can be adapted to all individual requirements and needs, and the fully automatic "Peerless" is now obtainable; even when the seam is passing through the cutters no supervision is

expression nip realises a 100% equal pressing-out effect; the guiding rollers, covered with stainless steel of 3 mm. and mounted in special bearings, ensure a creaseless cloth run. The steaming and batching chambers consist of segments of cast-iron with casings of stainless steel. The steamer is provided with a steam-injecting device of new design. The reaction chambers have casings of stainless steel and heated covers and the open width washing machine is equipped with vibrators of special design.

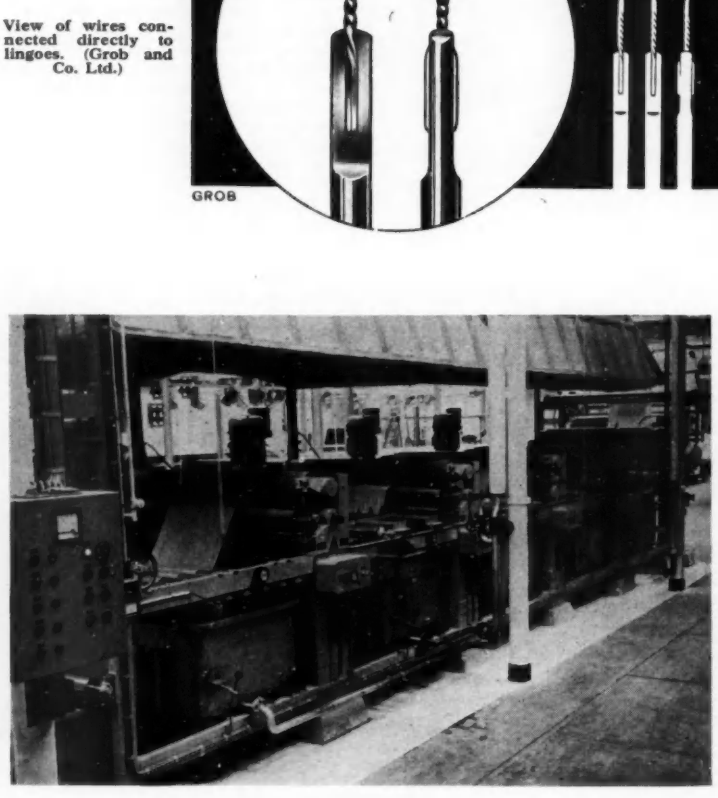
Units of the Stork after-treatment plant "Rope-o-matic" for printed cloth will be exhibited, also a mangle with 2 bowls, each having a diameter of 50 cm.

* * *

The most important development exhibited on **Stand No. 6313 - 6320** by **Grob and Co. Ltd., Horgen, Switzerland,** is the "Grobtex" light metal weaving frame in which the heald rods are no longer held in place by slide hooks, but are directly riveted to the light metal staves. "Grobtex" frames are equipped with easily interchangeable side supports and four different light metal stave sizes allow the frames to be employed for all pitches of dobby and loom widths.

The well-known "Grob" light metal weaving frames also show various constructional innovations. A wide assortment of raising and lowering hooks, as well as various drying elements, allow the frames to be used on all weaving systems. Besides the soldered wire healds for frame weaving, the steel wire healds for jacquard weaving with directly connected lingoes are worthy of note. These healds are attached to the lingoes without the conventional connecting rings. Also exhibited is the firm's harness storage device, and various types of electric warp-stop motions for silk, cotton and woollen industries. (British representatives—M. H. Spencer Ltd., Priory Mill, Coventry, and Samuel Smith and Son (Healds) Ltd., Eccleshill, Bradford.)

View of wires connected directly to lingoes. (Grob and Co. Ltd.)



The Stork open width bleaching range

required. For the first time also Vollenweider exhibit their chain-stitch sewing machine and butt-end sewing machine. (Sole agents for U.K. and Eire—A. E. Aspinall Ltd., Manchester.)

* * *

Zellweger Ltd., Uster, Zurich, Switzerland, exhibited their well-known evenness tester which is constructed in two models. Model B was designed especially to test the irregularity of slivers, rovings and yarns of cotton, staple fibre, wool and worsted, hard fibres, etc., and Model C serves especially for testing rayon and all fully synthetic filaments.

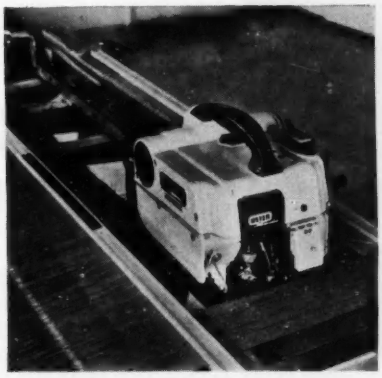
The Uster integrator, on view, is for quick and accurate determination of a numerical value for the irregularity. Model L shows the average linear irregularity U%, whereas Model Q gives the coefficient of variation CV%. The apparatus is equipped for carrying out high speed tests.

The automatic spectrograph is an additional apparatus to the evenness tester and serves for analysis of the periodical irregularity of slivers, rovings and yarns. The automatically registered spectrogram permits a quick and accurate localisation of sources of errors in spinning machinery as well as a detailed check of the individual drafting zones.

Other testing equipment on view included the Uster imperfection indicator; the varimeter; the automatic yarn strength tester; the thread tension gauge; and the staple fibre diagram apparatus.

The Ustermatic tying machine replaces the existing five types of the "Little Uster" warp tying machine. One machine is suitable for tying any material with or without leases. A tying rate of up to 600 knots and more per minute is achieved, and a newly designed gaiting-up device permits a considerable reduction in the time required for preparation. Further advantages are automatic stopping device in the case of double ends or flats in the lease and automatic regulation of the working speed.

Uster reaching-in equipment has been completely re-designed and replaces the well-known Turicum reaching-in machine. The new machine also takes over the work of the hander-in. The threads of the warp are selected automatically in the correct sequence and are kept ready for the reacher-in, whereby the machine, without



The Ustermatic tying a warp without a lease

any changes, is suitable to work either from a lease or without a lease. An additional dropper selecting device offers, furthermore, the possibility of selecting and drawing-in simultaneously closed drop wires.

A fully automatic drawing-in machine has been developed, is controlled by a paper card, and is able to draw in automatically into 2 - 28 shafts 25,000 - 50,000 ends per 8 hours. The Uster dropper pinning machine permits the fully automatic placing of open drop wires for stop motions on to warps provided with an end and end lease. The machine, which pins up to 300 droppers per minute, can be used on the loom as well as in the drawing-in department.

Additional equipment shown included a denting machine; a warp leasing machine; a hand knotter; and slub catchers.

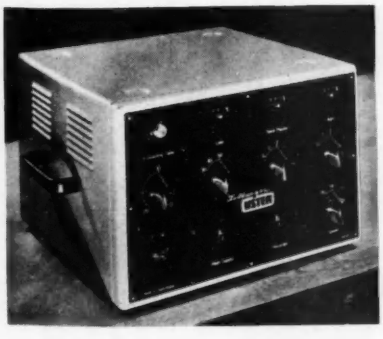
* * *

The new three-operation system of worsted drawing with ASD spinning exhibited by **Prince-Smith and Stells Ltd., Keighley,** on **Stand No. 7117,** is stated to be the shortest and most flexible method known for producing worsted Continental type yarns from wool tops and blends of wool and man-made fibres. It is based on two consecutive Raper "Autolevelling" processes in the drawing, the third operation (fed from a twistless sliver), having a new type of fibre control in the drafting zone. The four worsted drawing and spinning machines of the system are: (*a*) Raper "Autoleveller" "Speed-o-Gill"; (*b*) "Autoleveller" bicoiler draw box; (*c*) Amblerdraft finisher and (*d*) "Megaflex"/ASD ringframe.

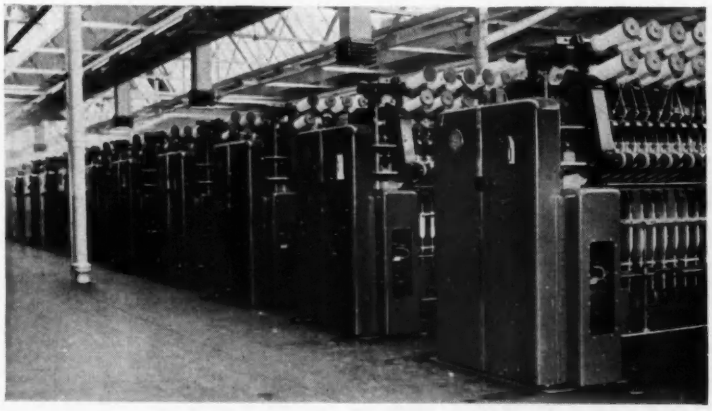
The first two machines are well known but the "Amblerdraft" finisher, has a completely new type of drafting zone. The "Amblerdraft" unit borrows the technique used in the ASD spinning unit and gives excellent control of the fibres being drafted. Rovings containing twist are produced at the "Amblerdraft" finisher, even twist insertion being assured by the gear-driven spindles. The introduction of this new machine brings ASD spinning within the reach of all Continental spinners, as it can convert any twistless sliver of suitable weight per unit length into twisted rovings for ASD spinning.

* * *

Taylor, Wordsworth and Co. Ltd. are showing their "K" type wool wash bowl, 6 ft. wide, incorporating many new features. The bowl exhibited is of the self-cleaning type and is used as the first, and in some cases also the second, bowl in a set of wool-washing bowls. Special means are provided for the very rapid disposal of grease and mineral dirt as it is extracted from the wool. Automatically operated valves can be set to open at any desired interval, and to remain open for any required length of time. The settling tank is underneath the main bowl, allowing the overall width of the machine to be kept to the minimum.



The Uster imperfection indicator



Prince-Smith and Stells "Megaflex"/A.S.D. ringframes with automatic underwinding (courtesy, Fielding and Johnson Ltd.)

THE SHIRLEY AUTOMATIC LOOM

Photograph by courtesy of Messrs. Wilson & Longbottom, Barnsley.

This scientifically designed and precision built loom requires a motor of quality and design in keeping with the high standard — naturally an A.E.I MOTOR.

For all your textile machinery drives, specify A.E.I.

ASSOCIATED ELECTRICAL INDUSTRIES LIMITED

MOTOR & CONTROL GEAR DIVISION — **RUGBY & MANCHESTER, ENGLAND**

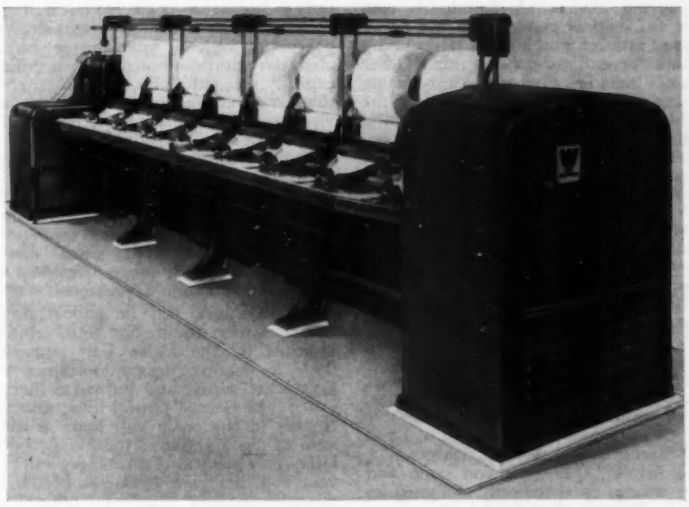
INCORPORATING THE MOTOR & CONTROL GEAR INTERESTS OF BTH & M-V

Whitin Machine Works, Massachusetts, U.S.A., exhibit their new super lap preparation method which is claimed to increase comber productivity up to 25% through use of heavier laps. The new method utilises two machines in preparation of the lap, first the "Even-Draft" drawframe followed by the super lap machine. The "Even-Draft" drawframe is designed to operate at 400 ft./min. (122 m./min.) on carded and combed work. The machine has eight deliveries with pneumatic waste removal. The highly efficient draft system has four-over-five rolls. Can sizes are 16 × 36 ins. (40·6 × 91·4 cm.), 16 × 52 ins. (40·6 × 132 cm.).

The new Whitin super lap machine has three heads, each fed by 16 - 20 slivers from the drawframe. The ends pass downward through the vertically arranged special two-over-three drafting system, passing along a table where the sheets are superimposed, through a calendering device and to the lap roll. When the required lap size is made, the lap is automatically ejected on a receiving tray. After insertion of the lap spool, the machine is started up by the operator.

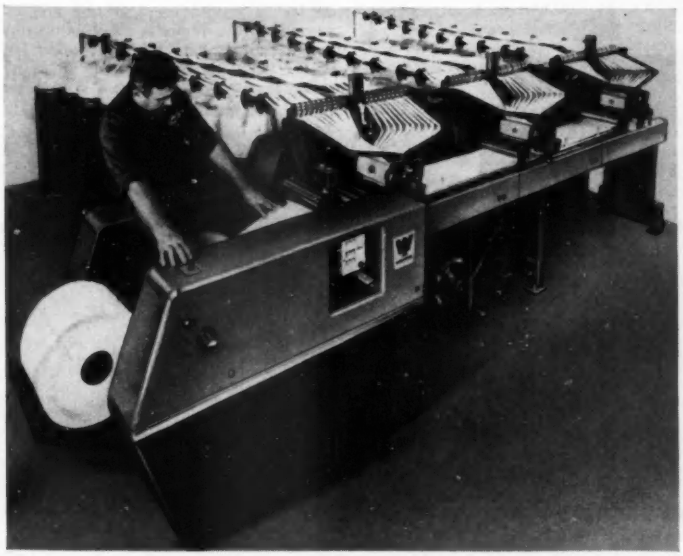
The latest model Super J comber features a new pivoted nipper assembly and improved combing action by the half lap and top comb. Production increases up to 20 or 25% are said to be attainable. Maximum production with a very heavy lap and minimum noil removal has been demonstrated in a range of 55 lbs./hr. (24·9 kg.). On premium quality combing using laps weighing 825 gr./yd. and extracting 14 - 16% noils, productions are in the range of 42 lbs./hr. This eight-head machine runs at 150 nips/min.

The Model K spinning frame is newly designed. Only 27 ins. (68·6 cm.) in width, the machine has a single spindle drive which eliminates the cylinder, tapes and under-frame pulleys. The yarn path is vertical from the front rolls and an entirely new scientific balloon control arrangement using two rings has been developed. In the new design, simplified precision gearing and improved builder are all contained in the head end.



Whitin Super J comber

The "Quik-Set" roving frame has a strong top arm using spring weighting which can be read directly in pounds on the scale on the front surface of the arm. The weight can be easily changed and ensures uniform weighting on rolls. The three-roll drafting system will accommodate fibres with effective lengths from 2¼ to 8¾ ins. (6·3 - 222 mm.). Drafts recommended range from 8 - 20. Distance between the rolls can be instantly adjusted by turning a handle and accurately measured in small increments on the gauge. An instant ratch adjustment ensures exact roll alignment the length of the frame. This feature permits rapid mill adjustment in changing from one fibre length to another and in making proper machine accommodations for processing different stocks. The "Quik-Set" roving frame processes worsted sliver weighing up to 120 gr./yd. (8·49 gm./m.) and up to 100 gr./yd. (7·08 gm./m.), for 100% synthetics. (U.K. agents, A. E. Aspinall, Manchester.)



The Whitin super lap machine

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J. Hengstler, K.G., Kreis Tuttlingen, Germany. The main theme of the exhibits shown by this firm is predetermination and control of production by automatic counters. In the spinning range, Type 86 offers a solution to the problem of pre-planning of sliver production either by yardage or the hank system. A pre-signal light warns the operative that the pre-determined length is imminent, but if not noticed the machine will be stopped by a built-in electric switch. This counter can be equipped with a totalisor for one, two or three shifts. Hank counters up to three shifts for spinning and doubling frames, etc., are also on view. For yarn preparation, types 33a and 33b pre-set counters are specially constructed for the production of measured lengths and can be adapted to most makes of winding frames. Mechanical or electric stop motions are incorporated; also worthy of mention is the type 33b with scissor device.

In weaving a complete range of predetermining counters include No. 63 pre-set pick counters with or without totalisors up to three shifts, loom cut meters with mechanical or electric stop device and loom pick counters for up to three shifts. Amongst the revolution counters on view is a special type of predetermining counter No. 234a, with automatic repeating device and built-in electric switch. This offers numerous possibilities especially when it is desired to continue the flow of production without interrupting the movement for re-setting. (Sole agents in the U.K.: J. Darbyshire and Co., 109 Chorley Road, Swinton, Lancs.)

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On **Stand No. 6002, Grosse Webereimaschinen G.m.b.H., Neu-Ulm, Germany,** feature an open shed jacquard for endless paper, with one cylinder, also an automatic jacquard with revolving cylinder movement for French fine pitch jacquards. Another speciality on

view is a special jacquard for labels with card saving device. A double-lift cam dobby for endless paper cards has many points of interest, also a cordless repeating machine for endless paper cards. Other exhibits include a piano card-cutting machine with revolving movement of the punching carriage, and a card lacing machine with automatic card feed. (J. Darbyshire and Co., 109 Chorley Road, Swinton, Lancs., are the U.K. agents.)

* * *

The "RTA" superspeed rotary traverse automatic winder, shown by **Thomas Holt Ltd.** on **Stand No. 5156,** is fully automatic and built on the travelling spindle principle. It is designed to wind cones or cheeses at highest possible speeds according to suitability of supply.

The "RTM" superspeed rotary traverse winder incorporates a special design rotary traverse to give, it is claimed, the highest possible winding speeds. It has a variable speed to suit quality of yarn and is fitted with "Yarnspec" electronic clearers.

The firm's "Q2" precision cone and cheese winder is specifically designed to wind the finest synthetic yarns on to cone or cheese, with either tapered or straight ends. Important features include constant yarn speed, constant pressure and constant tension. The "PU" heavy duty cone or cheese winder is designed to make precise wound packages at a constant yarn speed, 8, 10 or 12 ins. traverse. Maximum diameter of 14 ins. Ideally suitable for winding coarse or folded yarns, giving yarn weight on package up to 36 lbs.

* * *

At the Milan Exhibition the **Scragg Group, Macclesfield,** exhibit on **Stand No. 7106,** yarns and garment applications to demonstrate the potential scope of Astralene-C polyester and Astralon-C polyamide, stabilised high bulk modified filament yarns produced by the first British textured continuous filament yarn process, to be made internationally available according to trademark and patent licensing agreements.

Astralene-C and Astralon-C yarns are produced on Scragg Group machinery to operating specifications stipulated by the company. The new process—disclosed only to licensees—is carried out in a single cycle of operations. The resultant yarns possess completely non-torque physical characteristics combined with a covering capacity claimed to be up to 50% greater than wool yarns of the same weight. Other vital properties and characteristics include new standards of softness, absorbency, resilience and low stretch, complete dimensional stability under wet treatments and excellent dye affinity. In knitted garment form pre- or post-boarding or thermosetting techniques are totally eliminated. Package dyed yarns can be produced in a wide range of colours with important economic advantages.

No machines will be shown on the Scragg Group stand, due to an embargo imposed by the Milan Fair authorities. This is because Scragg machines were shown at Leipzig and Poznan earlier this year. The Scragg Group hope that their friends in the trade will make a special note of the number of their stand, where large-scale pictures of machinery will be on view together with examples of the new textured filament yarns and other yarns, fabrics and garments to display the scope and potential use of Scragg Group machinery and equipment.

* * *

The display by **Texnovo S.p.A., Via Revere 8, Milan,** on **Stand No. 6025,** included a range of automatic shuttleless looms weaving at high speed rigid and elastic webs having identical selvedges. The TX. 10/40 is a loom with 10 weaving units that can weave up to 40 mm. in width, and the TX. 2/80 a loom of very high speed with 2 weaving units that can weave up to 80 mm. in width. A medium size on view had 3 weaving units for webs up to 160 mm. in width and 1 weaving unit for webs up to 240 mm. in width. For the first the firm showed a new type of superspeed loom equipped with weaving units having needles instead of bobbins. This has 16 weaving units that can weave up to 25 cm. in width at 800 r.p.m. plain ribbons such as strips for zip-fasteners. An automatic shuttle changing loom completed this interesting exhibit.

Prominently displayed on **Stand No. 6046 - 7** by **British Northrop Ltd., Blackburn,** was the MRT high speed 44 ins. 2-box model, for the high speed weaving of silk, rayon and synthetic continuous filament yarns. The MRT/44-2 has improved suction control of the weft and employs a photo-electric cell feeler; low-built rigid framing and roller bearings for crankshaft and swing rail.

In the MRT/44 ins. high-speed single shuttle loom on show many special design features are incorporated, to ensure perfect and continuous operation at high speed, including specially strengthened framing with rigid cross girt to carry main crankshaft bearings, an entirely new picking motion and advance form of shuttle checking motion.

The LF/48 ins. 4-box loom is demonstrated weaving an attractive colour check effect, with a top beam arrangement which will prove of special interest to manufacturers of fancy fabrics. The fourth loom on display will be the Northrop LF/48 ins. terry loom, which incorporates the latest design of pile warp control and pile warp stop motion. Northrop range of terry looms covers widths up to 110 ins., with single shuttle or box motions.

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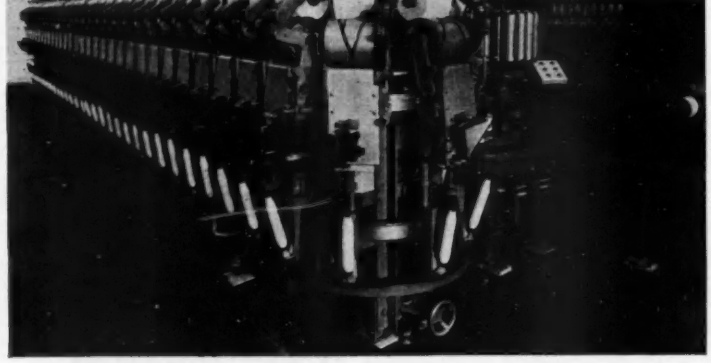
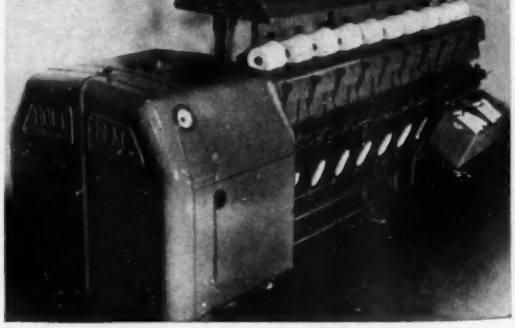
The heavy duty rag grinder exhibited by **Augsburger Textilmaschenfabrik G.m.b.H.,** on **Stand No. 1225,** has been improved in many of its essential parts. A cleverly designed pneumatic bits transporting system from the drums to the feed table ensures material which, it is claimed, is free from bits to an extent not previously possible, also return transport without trouble or obstructions. Use of conveyors and suction nozzles provides a system for separating foreign matter without risk of fire, and overloading of shafts and gearing, etc., has been virtually eliminated. The machine will produce 200 kgs./hour or more depending on the material being processed.

On view for the first time at the exhibition, an automatic charging device for the grinder, will attract much attention. Tests have shown that one man can attend two or three machines when this charging device is employed and one major advantage of the device is absolute uniformity of layer on the feed table. Another feature of the stand is the improved machine for stamping wool, staple fibres, cotton, waste,



Model "RTA" superspeed rotary traverse automatic winder, shown by Thomas Holt Ltd., Rochdale



Model "RTM" superspeed rotary traverse winder. (Thomas Holt Ltd., Rochdale)

etc., into sacks or dye vessels. Designed for continuous feed and/or hand filling, one man is able to handle 700 kgs. of material per hour depending on the capacity of the sack and the material in process. (Macart Textiles (Machinery) Ltd., 108 - 109 Swan Arcade, Bradford 1, are the U.K. agents.)

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Kenyon Italiana, a subsidiary of **Wm. Kenyon and Sons Ltd., Dukinfield,** exhibit on **Stand No. 7423** items of special interest to spindle users. The new "Kenbrake" combined clutch and spindle brake provides an entirely new method of stopping one or more spindles of a 4-spindle tape drive in a manner that allows the tape speed to be maintained and the remaining spindles to work without undesirable speed losses. The "Kenbrake" cuts down tape wear and prevents excessive braking.

"Kennylbond" nylon spindle tape is already well known throughout Europe. Manufactured in Italy by Kenyon Italiana, "Kennylbond" is woven from 100% nylon yarn and is subjected to a special heat-stabilising and stretch treatment immediately after weaving. "Kennylbond" tapes are made endless by a special bonding process which makes use of the thermoplastic properties of nylon. The bonding is carried out on a special electric bonding machine developed to take the place of the normal tape sewing machine. The bonding platens are thermostatically controlled at a predetermined temperature and the whole process, producing a permanent bonded joint, takes only 30 - 60 secs. to operate. The bonding medium is a thin film of a special low-melting-point nylon polymer.

Design Award for Cotton Fabrics

Leading cotton fabric houses will support a design competition sponsored by the Cotton Board in collaboration with "Vogue." The purpose is to draw attention to the high standard of design achieved by the British cotton industry on cotton fashion fabrics and to encourage young British designers producing many of these designs.

A panel of fashion and fabric personalities will judge the competition and ten or more prizes of £100 each will be awarded. Firms supporting the competition will put the winning designs into production and the new fabrics will be related to a major retail store promotion to be introduced by "Vogue" and the Cotton Board in 1961.

The competition is open to artists under 35, whether textile designers or not. Actual designs for woven or printed cotton dress fabrics, including cotton knits or lace, and decorative drawings or paintings providing ideas for textiles will be considered. Each artist may submit three entries which should be sent by November 6, 1959, to Cotton Fashion Fabric Award, Vogue House, Hanover Square, London, W.1.

U.S.S.R. Contract for Platts

Platt Bros. (Sales) Ltd., Oldham, report a further order from the U.S.S.R. for woollen spinning machinery to the value of over £¼ million. This equipment will be made at Platt Brothers & Co. Ltd., Oldham, with deliveries commencing at the end of this year.

Trade Literature

DUPAR CONTROL EQUIPMENT. Dewhurst and Partner Ltd., Inverness Works, Hounslow, Middlesex, designers and manufacturers of remote control equipment for over a quarter of a century, have recently released a leaflet announcing a new range of Remote Control Stations, each of which is built up from a number of standard units providing a wide choice of control systems to suit many purposes. Examples of the basic units used in the Dupar system are illustrated in the leaflet, enabling items to be selected at a glance.

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I.C.I. TECHNICAL PUBLICATION INDEX. I.C.I. Ltd., Imperial Chemical House, Millbrook, London, S.W.1. The fourth edition of the Subject Index to Dyestuffs Division Technical Publications, Jan. 1945 to Dec. 1957, is now off the press. Compiled to serve as a guide to the more recent technical literature of the Dyestuffs Division, the index contains literature relating to the products and industries served by the Dyehouse Dept., Miscellaneous Chemicals Service Dept., Resins Service Dept., and the Rubber Service Dept. The general pattern of earlier editions has been followed but modifications have been made to increase the usefulness of the index.

* * *

ARTICULATED OR FLEXILINK COUPLINGS. An illustrated catalogue from Twiflex Couplings Ltd., Twickenham, sets out brief notes intended as a guide. The Flexilink is adequate for straightforward motor drives and will accommodate moderate misalignment. It is suitable for bi-directional drives and can be used on engine drives when the driven machinery has low inertia. The articulated design is preferable where severe torque fluctuations have to be absorbed and is not suitable for bi-directional drives.

* * *

MECHANICAL HANDLING MACHINERY. For 70 years Herbert Morris Ltd., Loughborough, have been designing and manufacturing mechanical handling machinery. In a new 62-page booklet many types of lifting machinery are mentioned. These range from the lifting trucks, operated either manually or electrically, to the mighty electrically-driven jib-cranes for quayside service.

* * *

MAX-LOAD ROLLER BEARINGS. An excellent, well illustrated catalogue from Pollard Bearings Ltd., Ferrybridge, Knottingley, Yorks, provides a wealth of information valuable to all bearing users. The complete range of "Max-Load" bearings is tabulated giving all relevant dimensions, weights, working load ratings and the basic reference numbers of American made bearings to which Pollard bearings correspond. Also dealt with, are bearing selection details, conversion graphs, details of bearing location, alignment, retention and seals.

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RENOLD CLUTCHES AND COUPLINGS. The first of two useful, informative, catalogues now available from Renold Chains Ltd., Renold House, Wythenshawe, Manchester, describes and gives operational data and dimensions for the various types of Sprag clutches, together with a section on typical mounting arrangements and installation and maintenance. The second, called "Which Renold Coupling," deals with three types of coupling: "Flexible Spider Couplings," "Flexible Disc Couplings," and "Chain Couplings." Brief details of each are included together with illustrations.

* * *

HYDRAULIC RELAY CONTROL. Leaflet D.F.C.2, a new publication giving details and dimensions for the Hydraulic Relay Speed Control for "F" type Carter hydraulic variable speed gears, is now available from Carter Gears Ltd., Thornbury Road, Bradford 3. Intended as a guide for potential users, it includes notes on the application of this control for variable speed drives where only light operating forces are available.

* * *

CHEMICAL APPARATUS. Platinum vessels and apparatus are essential tools in accurate chemical analysis. Platinum resists the action of almost all acids and is unaffected by a wide variety of corrosive substances; it has a high melting point, a low heat capacity and can be strongly heated in air without change of weight due to oxidation. A 43-page catalogue from Johnson, Matthey and Co. Ltd., Publicity Dept., 73 - 83 Hatton Garden, London, E.C.1, comprehensively surveys the J.M.C. range of platinum laboratory apparatus and includes useful advice on care and maintenance.

* * *

"SPECTROSOL" SOLVENTS AND P.U.S. REAGENTS. The first of two catalogues recently produced by Hopkins and Williams Ltd., Freshwater Road, Chadwell Heath, Essex, briefly describes "Spectrosol" solvents for absorption spectroscopy. A complete list of the solvents available at present is inserted. The remaining catalogue concerns P.V.S. Reagents purified for volumetric standardisation, those listed include potassium dichromate P.V.S. potassium iodate P.U.S., sodium chloride P.V.S., benzoic acid P.V.S., and potassium hydrogen carbonate P.V.S.

* * *

POWER THROUGH THE AGES. No student should be without a copy of "Power Through the Ages," featured in a recent Mobil Industrial Review and available from Mobil Oil Co. Ltd., Caxton House, Tothill Street, London, S.W.1. Commencing with man-power, the booklet traces energy transformation and application in an extremely interesting and absorbing manner and uses many illustrations. A section on electricity outlines its development from the 18th century.

* * *

MARCONI INSTRUMENTATION. Feature articles in a recent edition of "Marconi Instrumentation," the well-known technical information bulletin, include: "Circuit Magnification Meter, Type T.F. 1245," by J. M. Parkyn, "Inter-modulation Testing Using the Marconi White Noise Test Set, Type C.A. 1249A," by G. Roper, B.Sc., and "The Uses of Travelling-Wave-Tube Amplifiers with Reference to M.1 Units, Types T.F. 1278 and T.F. 1278/1," by L. M. Sargent.

Strong Light-Weight Fabrics

The search for new constructions in fibres, yarns and cloths never slackens. Some of the possibilities which do offer distinctive advantages and features are discussed with details of twist and structure

By A. JOHNSON, M.SC., F.T.I., C.G.I.A.*

LIGHT-WEIGHT fabrics are always fascinating to dress designers but, unfortunately, they too often lack the strength and durability necessary for utility markets. Furthermore, this class of material, especially when made from fine counts of staple fibre is not simple to manufacture, often needing sizing before weaving and requiring the close attention of highly skilled operatives.

Textile history records many attempts to support weak single yarns by fine, strong filaments of silk, always in the hope that the supporting yarn would be invisible in the cloth. It was not until the invention of high tenacity rayons, however, that supporting material of satisfactory fineness and strength in sufficient quantities for general use became available. Thus, when 30 den. rayon is combined with 48s w.c. wool, a count far outside the range possible to weave alone, a ratio of 1 : 5 in terms of weight results so that there is a good chance that the support might be hidden within the bulk of the supported. The position when filaments of 15 or even 10 den. is used is still more favourable, indeed the main limitation in this direction appears to be the difficulty which operatives experience in seeing the extremely fine threads during processing.

The direction of twisting during twofolding also has an influence on the visibility of the supporting thread. For example, "Z" twist in both components might pack the finer thread within the fold of the coarser or an initial high twist in the effect thread could, during its reversal in twofolding envelope the support by its greater bulk. Unfortunately, the exact result cannot yet be forecast, but in a preliminary trial a number of yarns were combined with a fine supporting thread of 30 den. nylon—so that its effect on the strength and appearance of the cloth could be appraised in a general way. The effect yarns used were selected from stock and not the specially prepared range which could, with obvious advantage, be used in technical investigations.

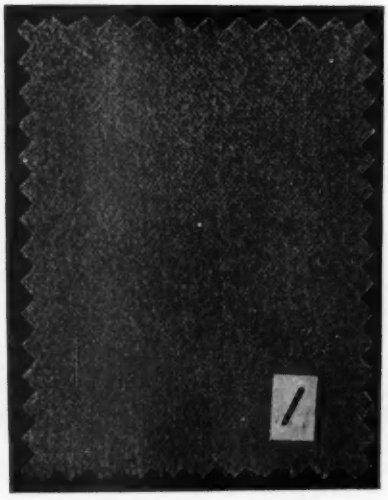
* *Associate Professor of Textiles, University of Technology, Sydney, Australia.*

Yarn Structure

(1) 60s c.c. cotton, 20 "S" 30 den. nylon	20 "Z"
(2) 60s w.c. "Fibro" 70%, wool 30%, 20 "Z" 30 den. nylon	15 "Z"
(3) 48s w.c. "Fibro," 20 "Z" 30 den. nylon	15 "Z"
(4) 48s w.c. "Fibro" 70%, wool 30%, 20 "Z" 30 den. nylon	15 "Z"

("Fibro" is viscose staple fibre of Courtaulds Ltd.)

It will be noted that only in Yarn 1 was the effect thread de-twisted when combined with the support, but in preliminary yarn tests, this so reduced its strength that it was considered advisable to add rather than deduct twist so that the objective of the trial, strength with lightness in weight, might be attained. This does not mean that Yarn 1 has no utility. On the contrary, when woven as warp and weft in a sturdy fabric it could be an interesting base for raising owing to the strength of the nylon. In such a process it is anticipated that the support would then be completely covered to produce an all-cotton, soft surface.



Cloth Structures

(1)	Warp	60s c.c. cotton, 20 "S" 30 den. nylon — 20 "Z"
	Ends	80 per in.
		22s c.c. acetate 50%, wool 50% 30 den. high tenacity viscose (core)
	Picks	110 ins.
	Weave	2/2 twill
	Width	Reed 46 ins. for 40 ins. finished
	Weight	4 ozs. per sq. yd.
	Tensile Strength (7 ins. × 4 ins.)	Warp—150 lbs. at 30% extension; Weft—160 lbs. at 16% extension

The appearance and handle of this cloth is very pleasing, but even more interesting is its resistance to tearing. The application of a crease-resist finish would make the fabric suitable for ties or even industrial applications.

(2)	Warp	60s w.c. "Fibro" 70%, wool 30% 30 den. nylon — 20 "Z"
	Ends	64 per in.
	Weft	As warp
	Picks	64 per in.
	Weave	Plain
	Width	Reed 40 ins. for 36 ins. finished
	Weight	2¾ ozs. sq. yd.
	Tensile Strength (7 ins. × 4 ins.)	Warp—160 lbs. at 25% extension; Weft—120 lbs. at 20% extension

A wiry, light-weight fabric which could, if desired, be set still higher to increase its strength and toughness. Its tensile strength of 160 lbs. is remarkable for a material so light in weight and prompts the suggestion that the use of 60s. w.c. wool supported on similar lines with 15d nylon would make an ideal light-weight material for dresses demanding wool-dominant characteristics. An infinite

(*continued on page 383*)

THE TEXTILE
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Crease-Resisting Theory (Untreated Textiles)

The creasing properties of fibres are profoundly affected by moisture, for fibres which are strained in the moist state and dried in the strained position tend to remain in that position

By J. T. MARSH, M.SC., F.R.I.C., F.T.I., F.S.D.C.

OF the many attempts made to measure the recovery from creasing of various textile fibres, probably the earliest is that of Krais (Textile Forschung, 1919, **1**, 71). The different fibres were attached to a small frame of cardboard which was pushed beneath a stretched silver wire; the sides of the frame were then cut away and the card bent around the wire so that the fibres were folded and could be compressed between the cards by a weight of 1 kg. for 24 hours. The fibres were then cut from one side of the card and freely suspended in order to observe (but not measure) their creasing angles; the order of recovery was wool, silk, rayon, and cotton. Krais also observed a rapid recovery in a moist atmosphere with wool, silk, and viscose, but not with cotton.

A somewhat similar test was devised independently by Hall (J.S.D.C., 1930, **46**, 267) whereby rayon yarns were wound around a strip of cardboard and subjected to a pressure of 20 lbs. for 5 mins., after which the card was removed and the yarn examined for its "crease-trace," allowing 5 mins. for any linear contraction to occur. This type of testing has been elaborated to utilise a strip of card 2 cm. in width and 0·6 mm. in thickness, around which the yarn is wound under constant tension of 10 g., and then allowed to remain creased for 10 mins. before cutting longitudinally through yarn and card, so forming a number of yarn fragments in the shape of the letter "*V*." These fragments are allowed to fall on to a surface of glass or mercury, where they remain for 10 mins. before measuring the angle of the "*V*." A modification of Elod and Etzkorn (Angew. Chem., 1938, **51**, 45) employs a load of 20 grams per 100 denier for 45 mins. This method has been criticised as insufficiently accurate at the lower angular recoveries; some typical figures may be taken from the work of Lohmann and Braun (Textilber, 1937, **18**, 345):—

	Angular Recoveries
Wool ..	84 - 110; 80 - 99
Acetate ..	38 - 90; 35 - 76
Viscose ..	28 - 61; 24 - 42

A somewhat similar method of Kramer (Textilber, 1951, **32**, 314) places various fibres in the following order of crease-recovery: wool, polyester, silk, polyamide, acetate, viscose, cotton, flax.

Ever since the invention of the crease-resisting process by Foulds, Marsh and Wood in the laboratories of Tootal Broadhurst Lee Co. Ltd., followed by its world-wide application, there has been considerable thought and discussion about the reasons why some fibres show good crease-recovery and others do not; there has been an equal amount of consideration given to the various explanations of the fundamental theory underlying the various chemical treatments which impart crease-recovery to those materials in which it is normally lacking. Opinions are somewhat divided on these matters, partly because of some over-simplifications, and partly because of the wish to explain the whole phenomenon, both natural and imparted, as being due to a single cause.

There is one point on which all workers in the field of crease-resistance are agreed, namely, that when a fabric is creased many of the fibres are bent. The bending places the fibre in a position of strain which is often additional to that imposed by spinning and weaving, so that an apparently small bending strain may be quite severe in effect.

In the bent fibre, the outside of the crease or fold will be under tension, whilst the inside of the bend will be under compression (this feature forms the basis of the well-known processes of controlled compressive shrinkage for cotton goods); the central region will form a neutral zone. This is perhaps the simplest case to consider, although in actual practice there will probably also be some torsional strains, for the tensile forces are the most important in this particular aspect of creasing.

A simple idealised stress-strain diagram illustrates the general principle of the relation between these two factors. The small bend in the curve which is observed at low stress is typical of many fibre diagrams and is caused by the straightening of convolutions or kinks in the fibre; the dotted line shows the true course of the load-extension curve for these low stresses. The second part of the curve is generally straight and indicates that the strain varies with the stress; it is in this portion of the curve that Hooke's Law applies. As the stress is proportional to the strain, it is possible to measure the Young's Modulus in this region; this is the ratio of stress to

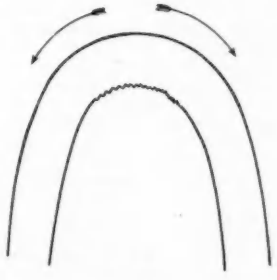

Fig. 1

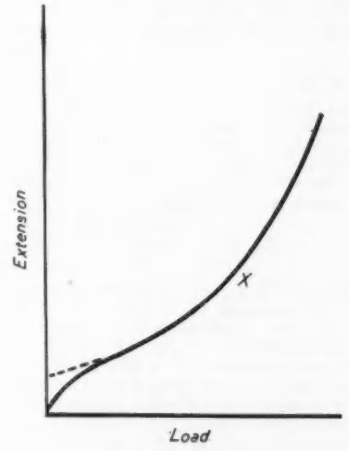

Fig. 2

strain and may be regarded as the load necessary to extend the fibre a certain amount. Comparisons of Young's Moduli are of interest in showing the stress which is necessary to produce the same extension but it should be remembered that this modulus of elasticity is only a constant for the fibre in the region where Hooke's Law holds. The final part of the curve indicates a somewhat sudden increase in extension for a small increase in load; the fibre has ceased to be elastic and is yielding to the stress. This point is indicated by *X* in Fig. 2, and is called the yield point although it is actually a region rather than a point. Beyond the yield point, the fibre is no longer elastic but exhibits plastic flow, recovery after the release of stress being incomplete in this region. Finally, the fibre breaks.

The stress-strain properties of fibres are strongly influenced by the time factor, and so are the creasing properties, for a small force applied for a long time will produce definite creases. The permanence of the crease is largely affected by force applied, and when this is large enough to exceed the immediate elastic limit in which Hooke's Law applies, there will be some extension or primary creep as new attractive forces tend to form in the direction of the stress and the old attractive tend to relax, producing strain in the fibre. This primary creep is generally recoverable under the same conditions of temperature and humidity (but not immediately); however, there is a second component, or secondary creep, which occurs when the immediate elastic limit of the fibre is exceeded, and this is non-recoverable.

There appear to be no quantitative data on the actual amount of extension which takes place on creasing or bending the various fibres, in spite of the extensive literature on the extensibility of textile materials with valuable contributions from Shorter, Peirce, Meredith, Leaderman, Smith, Hamburger and many others, including the most useful book "The Mechanical Properties of Textile Fibres," edited by Meredith (North Holland Publishing Co., Amsterdam, 1956). However, if one assumes the maximum strain on the fibre when bent to be roughly equal to the ratio of its thickness to that of the fabric, then a figure of 5 to 6% seems reasonable for many fabrics. Bochove and Schuringa (Teintex, 1954, **19**, 505) have given some recoveries from 4% extension, e.g. rayon 30 to 70%, cotton 50%, wool 80 to 90%, and nylon 100%.

It will be seen that there are two components in the extension of a fibre, namely, the elastic extension and the plastic extension; with many viscose fibres, the elastic extension is only 2% whilst the plastic extension may be 20%.

From the above fundamental data, an attempt has been made by Schwartzkopf (Kunstseide, 1933, **14**, 247) to derive a formula for the ideally elastic fibre:—

$$De = Db = \frac{100 \times d}{2\,Rb + d}$$

where *De* is the elastic extension, and *Db* is the extension at break; in the ideally elastic fibre, the elastic extension will equal the extension at break, i.e. there is no plastic extension. *Rb* is the radius of the smallest circle into which the elastic fibre on diameter *d* and elastic extension *De* can just be bent without exceeding the limit of extensibility of the outermost layer of the fibre.

It is generally agreed that the extension of the fibre will bring about some movement of the chain-molecules within it, according to the structure and arrangement. Perhaps the simplest example is that of silk with the helical arrangement of the molecules at an obtuse angle in the chain permitting rotation about the bonds of adjacent atoms. The chain molecules are not packed very closely because of the somewhat bulky side-groups; hence they have some freedom of movement. With wool, the molecules form acute-angled helices which permit still greater extensibility, but the keratin exists in two forms (*alpha* or folded, and *beta* or extended) allowing the fibre to extend and contract like an accordion. Close packing of keratin is impossible because of the side-groups, and as these form bridges between the main chains, their primary valency forces are powerful in restoring the extended molecule to its original position.

With cellulose, the position is very different for the molecular chain is almost fully extended; hence extension can only be effected by a slipping of the chain molecules on one another or by re-alignment of them with regard to the fibre axis. Slipping is prevented in the dry state by reason of the very large number of hydroxyl groups with which the molecule is studded and which have secondary valency forces quite sufficient to hold the molecular structure together. Re-orientation requires much less energy as illustrated by a great deal of data on extension. Because of the extended chain-molecule studded with hydroxyl groups, it is very easy for cellulose to form the well-known bundles, or micelles, or crystallites, and the strong secondary forces between them likewise restricts the freedom of movement.

The bending of a fibre into its position of strain must depend on either a molecular unfolding, a molecular re-alignment, or a slipping of the molecules on one another; hence the inter-molecular forces will determine the elastic recovery as with cross-linkages in wool. In the cellulose structure with the fully extended molecule, stretching of the fibre overcomes the secondary forces which reform in new positions, relaxing the stress on the primary valency bonds of the main chain, so that when the stress on the entire system is removed, the adjacent molecules do not return to their original position, the extension is non-recoverable, and the fibre remains creased.

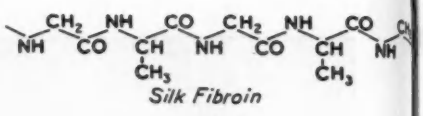

Fig .3

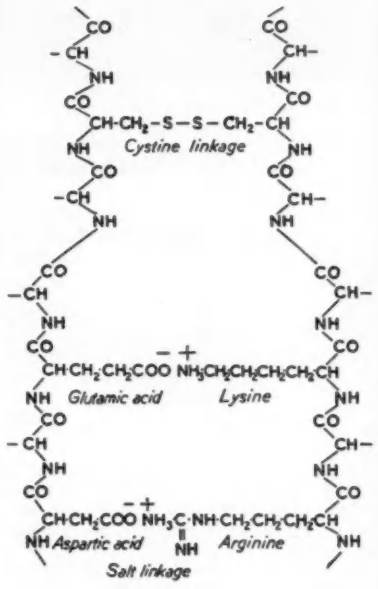

Fig. 4

Some of the earliest data on the effect of stretching on the recovery of manufactured fibres has been given by Hall (J.S.D.C., 1930, **46**, 267)

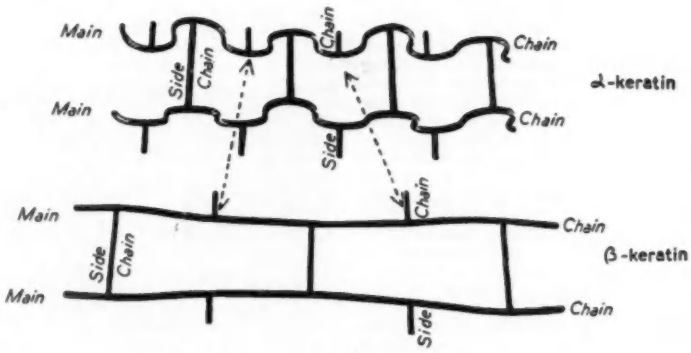

Fig. 5

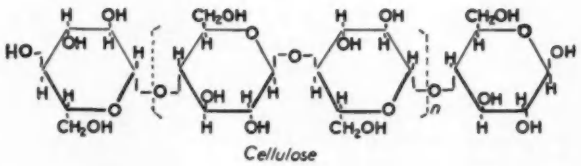

Fig. 6

Extension	Viscose: Angular recovery	Acetate: Angular recovery
0% ..	74°	170°
5% ..	57°	101°
10% ..	50°	67°
15% ..	41°	62°
20% ..	—	61°

With acetate rayon, it seems probable that the introduction of a bulky acetyl group into the cellulose chain has restricted the close packing of the chains and so improved the mobility of the molecules.

Thus, with wool and silk there cannot be very close packing because of the presence of bulky side-groups, the absence of which in cellulose permits the molecular chains to come so close together that the multiplicity of the forces developed between them restrict the freedom of movement. In wool, however, there is an additional and unique factor in that the molecular chain exists in a highly folded form which is stabilised by primary cross-linkages thus permitting and facilitating complete recovery from large strains.

Orientation

These simple experiments of Hall clearly demonstrated the importance of molecular orientation on creasing properties, and they have been confirmed many times since. As previously stated, the chain molecules of the various fibres occasionally come together in orderly array to form bundles

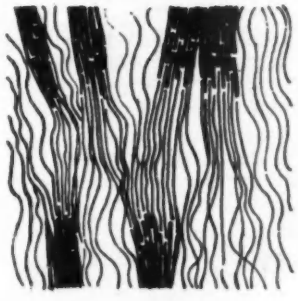

Fig. 7

or crystallites; elsewhere the molecular chains are at random in what are called the amorphous regions. This important picture of fibre structure includes the concept of some chains running through two or more crystallites to form a network which holds the structure together; the crystalline regions are responsible for the strength of the fibre and the amorphous regions for its extension and flexibility. It is, however, essential that this simple idea should not be over-simplified into two quite distinct and separate parts of the molecular structure, for on the contrary, there are many intermediate regions where orderly and random arrangements merge into one another in a rather indefinite manner. Instead of crystalline and non-crystalline, as distinct entities, it is perhaps better to think of areas of various degrees of orderly arrangement.

In addition to the influence of the orderly arrangement of the molecular chains, there is also the influence of the mutual arrangement of the micelles or crystallites, for they too may be in parallel or chaotic formation with regard to one another, and their disposition with regard to the longitudinal axis of the fibre, i.e. orientation, affects strength, extensibility, flexibility and recovery from creasing.

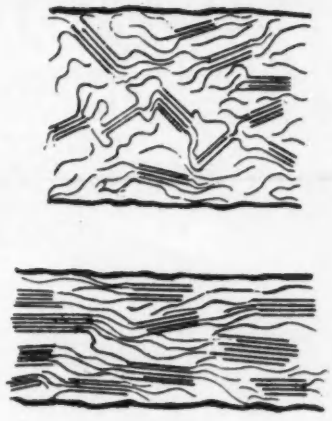

Fig. 8

There is ample evidence to show that the high tenacity rayons are highly orientated and crease more than the normal rayons; the latter, however, are not homogeneous but contain a skin and a core which differ in swelling capacity, dye-absorption and orientation as shown by Preston (J.S.C.I., 1931, **50**, 199) and many later investigators. This difference appears to be inevitable in industrial extrusion, and the high tenacity rayons often have a thicker skin than the normal rayons.

On the other hand, it has been claimed by Mark (Kunstseide, 1932, **14**, 411) that the structure of silk is such that the centre of the filament is highly orientated and surrounded by regions of increasing disorientation towards the periphery; this arrangement accounts for the high tensile strength and the resistance to creasing. Further experiments by Kratky, quoted by Mark (supra) resulted in the production of an orientated silk by causing the silkworm to spin on a rotating glass rod; the resulting filaments were highly orientated throughout and exhibited a reduced tendency to crease.

With rayon, a viscose thread of high orientation was dipped into a viscose solution and hence a disorientated outer layer of regenerated cellulose was formed; according to Mark (Paper Trade J., 1941, **113**, 34) the crease-resistance of the treated fibre was greater than that of the original.

Both nylon and "Terylene" are highly orientated fibres, and the latter is evenly orientated from interior to exterior; with nylon, however, there is some evidence for the presence of a skin structure as shown by Simmens (J.T.I., 1955, **46**, 715T).

In cotton cellulose, the degree of crystallinity is quite high (about 70%), but the crystallites are arranged in spiral formation around the long axis of the fibre at an angle of roughly 30°, whereas the pitch is much smaller in ramie and linen (0 to 6°) and these fibres crease even worse than cotton. It has also been shown by Morey and later by Conrad and Berkley (Text. Res. J., 1938, **8**, 341) that the angle of the spiral may vary between 20 and 50° in cotton, according to the variety and type, and there is a close agreement between the angle of spiral and the strength and extension; where the angle is large, there is higher extensibility and resilience. There is an analogy between the spirality of the crystallites and the twist factor in yarns. However, the most resilient cottons are generally of short staple which limits their use.

In pre-war years there was fair evidence for considering natural crease-resistance on the basis of the crystallinity of the fibres, i.e. the ratio of amorphous and crystalline regions, and the degree of orientation; with native cellulose, some minor variations in recovery has been recorded by Quehl (Textilber., 1939, **20**, 76) for mercerised cotton.

Recovery Angle	
Untreated cotton	51
Mercerised with tension ..	59
Mercerised without tension ..	69

It had also been suggested by Dubac (B.P. 254,695) that mercerising could produce crease-resisting rayon goods.

The advent of highly crystalline, highly orientated fibres like nylon and "Terylene," has destroyed any general relation between recovery and crystallinity.

Moisture

One of the most important factors which influence the elastic properties of textile fibres is the amount of moisture; as moisture is absorbed, so the extensibility increases. Water acts as a plasticiser, or lubricant, permitting movement of the molecular chains and swelling the structure. The creasing properties of fibres are also profoundly affected by moisture, for fibres which are strained in the moist state and dried in the strained position tend to remain in that position. It seems that during the drying process, the inter-molecular attractions re-form in the new position and hold the molecules there, but when the fibre is wetted again, the new forces of inter-molecular attraction are again broken so that the fibre may return to its old position to greater or less degree according to the extent, kind, and power of the original forces between the molecules. With wool, the recovery on wetting is generally complete, but with cellulose it is incomplete even after a long period of time.

It has been known for many years that when fabrics of cotton or rayon are completely dried over a period of time, they exhibit a good crease-recovery, for a few minutes only (as shown by Wood in 1919) when subjected to the "clenched fist" test. Some quantitative data on the effect of moisture and recovery angle have been given by Elod and Etzkorn (Angew. Chem., 1938, **51**, 45) showing that not only viscose rayon, but also acetate rayon and real silk, have improved recoveries at lower relative humidities.

Recovery and Humidity: R.H.	Viscose	Acetate	Silk
92% ..	17°	22°	23°
65% ..	32°	48°	78°
30% ..	54°	58°	95°

On the assumption that this might indicate a relation between recovery and absorptive capacity, some data were obtained by Quehl (Textilber., 1939, **20**, 76) who impregnated rayon with paraffin dissolved in benzene.

Recovery: Paraffin	Recovery
0 g./l.	75°
1 „	83°
3 „	92°
5 „	100°
10 „	88°
25 „	82°

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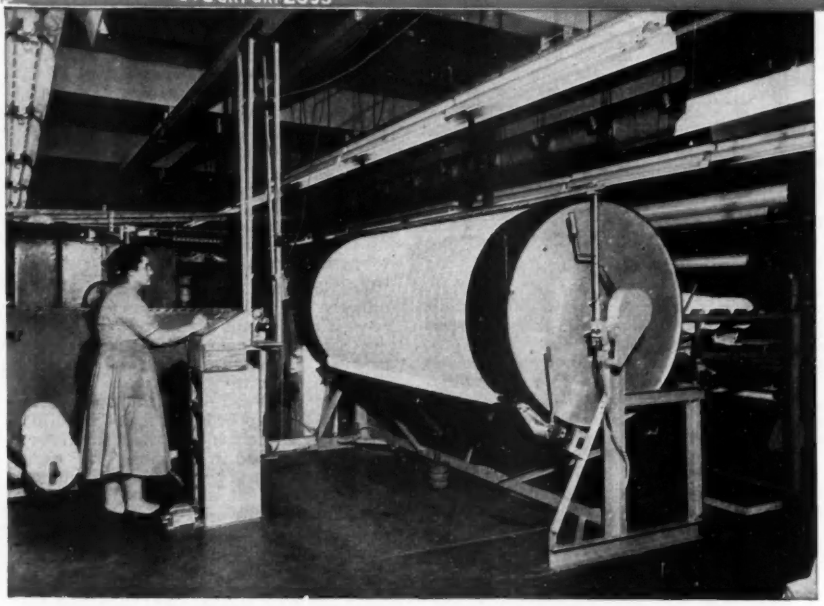

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All the rayon samples gave the same wet strength, whereas if paraffin reduced the actual swelling they should have increasing wet strength; accordingly Quehl rejected the hypothesis that reduced absorptive capacity is the principle reason for a reduced tendency to crease, and further pointed out that the sorption capacity of the main fibres followed a different order from their recovery from creasing. Nevertheless, the search for one universal explanation of crease-recovery should not be allowed to obscure the fact that in any one fibre the moisture content affects the recovery from creasing, and other physical properties, but not in the same manner in all fibres.

Whereas the extensibility of all fibres increases with the moisture content, the tensile strength behaviour of native cellulose fibres is anomalous in that it increases with increasing moisture. This behaviour is sometimes "explained" by saying that water releases internal stresses in the native cellulose fibre but weakens lateral cohesion in regenerated fibres; the anomaly deserves more detailed consideration for its explanation.

Hermans (Kolloid Zeit., 1944, **108**, 177) has dealt with the contradictory behaviour of cotton and viscose on the basis that the chain molecules are never equally loaded. Hence if *n* fibres of the same length are

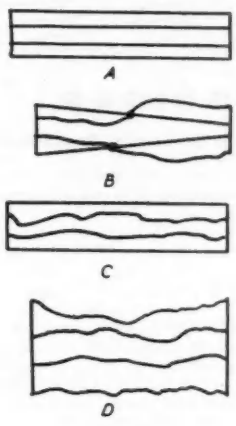

Fig. 9

clamped together, the stress at break will be *n* times that of a single fibre, but if some of the fibres are knotted or entangled or bonded they will not all give way at the same time. The chain molecules of wet native cellulose are of more or less equal length and therefore break together, but the chain molecules of wet regenerated cellulose are of unequal length, and being laid down from solution some are straight and others crinkled, so that the strength is that of the shortest. Further, as the chain molecules are shorter than those of native cellulose, the entanglements are less effective and easily separated by water so that the lack of uniformity receives full scope and the strength falls. When the fibres are dry the molecular chains are knotted by hydrogen bonds which will result in a less even distribution of stress and lower tensile strength with dry native cellulose, but with the unequal chain molecules of regenerated cellulose knotting them together will give a higher tensile strength.

With both native and regenerated cellulose, however, as with all fibres, the crease-recovery improves with decreasing moisture content, i.e. the drier the better; the fibres also become more rigid and the extensibility falls.

The Entanglement Hypothesis

Past consideration of many properties of textile fibres has suffered from over-simplification and from undue emphasis on various single features; there is a tendency to think of fibres which do or do not possess crease-resisting properties, but even the cellulosic fibres possess some degree of crease-recovery, however modest, which may be enhanced by certain methods of manufacture into yarn and fabric. There is some evidence that crease-recovery of all fibres may be at its best when the fibres are thoroughly entangled in a random arrangement in three dimensions or in a loose felt; a useful analogy may be taken from the resilience of a pile of brushwood. There is also considerable evidence that the crease-recovery of all fibres is at its best when they are dry. Hence one can see the possibility of the inter-dependence of these two factors, drying and entanglement, in a simple hypothesis of crease-resistance.

In the past, attention has been drawn on many occasions, and by numerous workers, to diminishing crease-resistance with increasing moisture in the fibre, and whilst the converse is undoubted, yet it does not appear to have been so obvious as to receive mention. Starting from the viewpoint of the conditioned fibres, there is a rather different scene if one turns one's back on the moist fibres to examine the vista of the dry fibres.

The Network

As is well known, the micellar theory of the structure of fibres was first postulated by Nageli in 1879, but the actual existence of the crystallite was proved by Ambronn in 1911 and enthusiastically adopted by Meyer and Mark (Ber., 1928, **61**, 593). A year later the illustration of the micellar structure of cellulose, like bricks in a wall, was put forward by Meyer and has found its way into most text books; from this conception the fibres would consist almost entirely of crystalline particles, but as the result of the work of a long list of investigators, the idea of a fringed micelle gained ground, and it was possible to conceive of numbers of free long-chain molecules joining the various micelles and running through them.

This led to consideration of a network type of structure which became simplified into the idea of the crystallites themselves acting as the knots in the network of long chain molecules. It had been pointed out by Frey-Wyssling in 1938 that reference should only be made to a micellar system and not to individual micelles; furthermore, the structure of gels consists of a network of individual molecular chains which come together at "junction points."

The idea of the system of rigid crystallites with more or less crinkled chains joining them, and folding during shrinkage, was not fully acceptable, although it still persists; it appears to assume an unduly high individual freedom of the chain molecules in the amorphous regions which would make a very flabby type of structure. Clear discussion was often complicated by over-emphasis on crystalline or amorphous regions of the fibres, according to the particular properties which were under consideration at one time. For example, a fibre is not a mono-crystal.

Physical Properties of Fibres

	Wool	Silk	Cotton	Viscose	Acetate	Nylon	"Terylene"
Density	1·32	1·35	1·52	1·52	1·33	1·14	1·38
Regain	16	11	8·5	11	6·0	4·2	0·4
Imbibition ..	50	50	45	95	30	13	5
Tenacity	1·4	4·9	3·5	2·1	1·3	5·0	5·0
Wet/Dry	86	85	120	50	62	87	100
Extension	38	26	8	21	29	22	20
Elastic Modulus ..	28	85	55	65	31	24	100
Torsional Rigidity	1·11	2·2	2·51	1·11	0·82	0·5	0·9
Elastic Recovery	75	51	36	36	27	91	70

The Dutch school of investigators has always stressed the importance of the amorphous regions of cellulose when discussing deformation and in particular the "junction points"; an account of their work has been given by Hermans (Physics and Chemistry of Cellulose Fibres; Elsavier; Amsterdam; 1949). Instead of the crystalline regions representing the junction points of the molecular network, the amorphous regions themselves contain the network structure or molecular felt, with the crystalline components embedded in it. Instead of a structure of hinged micelles, or fringed micelles, with free molecular chains acting as hinges, the network itself is contained within the amorphous regions of the fibre.

There are really two conceptions, one of a grosser network comprising crystalline and amorphous regions, and the other of a finer network of chain molecules in the amorphous areas themselves. In the amorphous network, there are the well-known "junction points" of any gel or colloidal system, and with the chain-molecules of fibres they may be likened to press-studs or snap-fasteners of hydrogen bonds or secondary valency forces; they are easily fastened and easily opened by moisture. Hence on drying a fibre, the free molecular chains which are randomly arranged in the amorphous regions approach one another at various angles and the secondary valencies or snap-fasteners come into action building up an irregular three-dimensional network or lattice or trellis with the characteristic elastic behaviour of such a structure. (This is in contrast to the crystallite where the hydroxyl groups on the parallel molecular chains are so arranged that hydrogen bonding operates like a slide-fastener or "zipper" as distinct from the individual

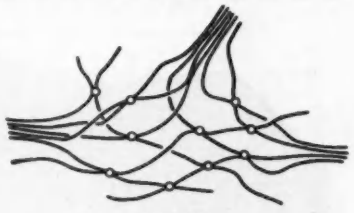

Fig. 10

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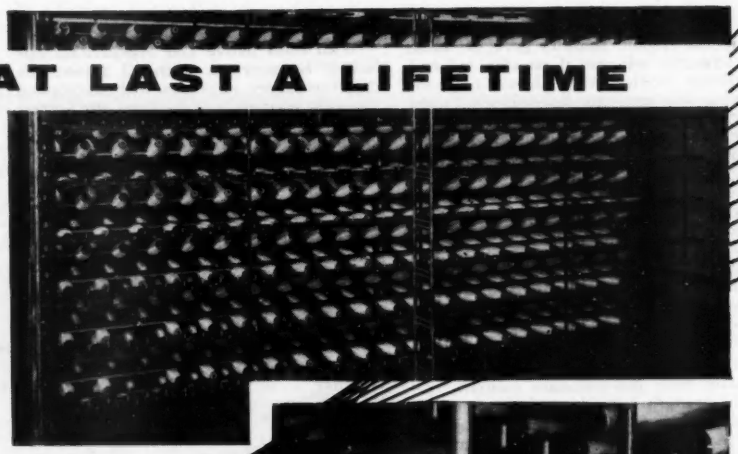

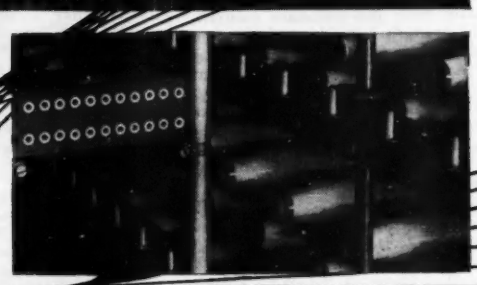

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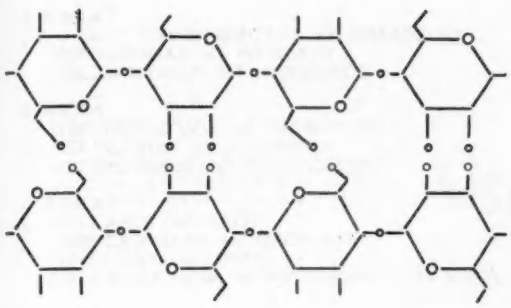


Fig. 11

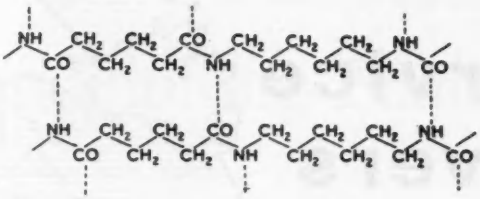


Fig. 13

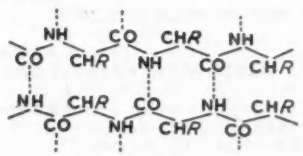


Fig. 12

press-stud.) Unlike the micelle itself, where the molecules are aligned and the total of secondary forces is high, water can readily enter the amorphous network, forcing the individual chain-molecules apart and breaking open the snap-fasteners, so that the trellis is destroyed and the elasticity falls.

To a limited degree the extent of orientation will affect the characteristics of the amorphous network by providing an excessive number of junction points in an unbalanced trellis with many acute angles on the one hand, in contrast to a more balanced lattice with larger frames and less junction points, on the other hand. It seems clear that the number and size of the frames in the amorphous network, and the angle of the individual frame, will all affect the elasticity of the structure.

The strands of the amorphous network itself are made by the individual chain molecules, the nature of which undoubtedly affect the elasticity of the whole structure. In cellulose, the chains are extended, but they are not fully extended nor completely straight, the glucose ring can yield a little, and there is a small amount of possible rotation between the rings; hence cellulose molecules in themselves can only make a very slight contribution to the elasticity of the amorphous network.

With silk, the chains are coiled in a helix so that there is very good elasticity in the individual molecule; similarly with nylon, so that in both cases the single chains have good elastic properties. As with cellulose, there are many hydrogen bonds which can act as snap fasteners when they come sufficiently close together, thus holding the micelle together when the chain molecules are in orderly array, and also forming the amorphous network when the chains are randomly disposed. The hydrogen bonding system with cellulose is O - H - O, and with nylon and silk it is O - H - N.

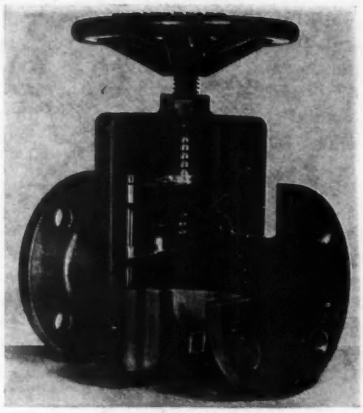
The case of "Terylene" is somewhat different from the aboye as there are no hydrogen bonds, and the chains must be held together by the normal van der Waal forces, operating at a distance of 4 to 5A. The presence of the symmetrical phthalic acid nucleus is responsible for a chain stiffness which brings "Terylene" within the region of Hooke's law for small deformations and so imparts elastic recovery to the fibre.

With wool, as is well known, the molecular chain has a grid structure and is also arranged in helical fashion; hence the individual chain molecule makes an enormous contribution to the crease-recovery of the fibre. Nevertheless, with all fibres, whether the normal crease-resistance is high or low, it improves on drying or dehydration which brings the entanglements closer together in the amorphous network to form a three-dimensional lattice with improved response to deformation.

New Pinch Valve

A NEW pinch valve recently introduced by W. H. Rowe and Son Ltd., Quayside Road, Southampton, designed for quantity production, is available in sizes from 1 to 3 ins. bore diameter. Die-cast construction has been used both for the casing and internal parts and the specially designed reinforced sleeves are suitable for internal pressures up to 100 lbs./sq. in.

The closing mechanism consists of two die-cast aluminium alloy anvils, a screwed spindle, and a handwheel which operate to compress the sleeve equally from both sides. In turning the handwheel clockwise to close the valve it drops in a logical manner towards the top of the casing by a distance equal to one half of the valve bore, and in doing so provides a ready external indication of the position of the valve. At the same time, the coarse threaded section of the spindle causes the bridge and lower anvil to rise a similar amount to pinch the sleeve equally about its centre-line. The reinforced sleeves are available in four grades of natural or synthetic rubber materials: (*a*) general purpose duties; (*b*) petroleum products, tar and ammoniacal liquors, and (*c*) abrasive materials. Illustrated is the 2-in. valve which weights 10 lbs.



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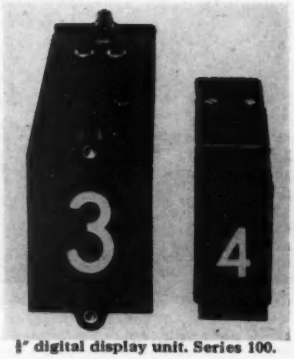

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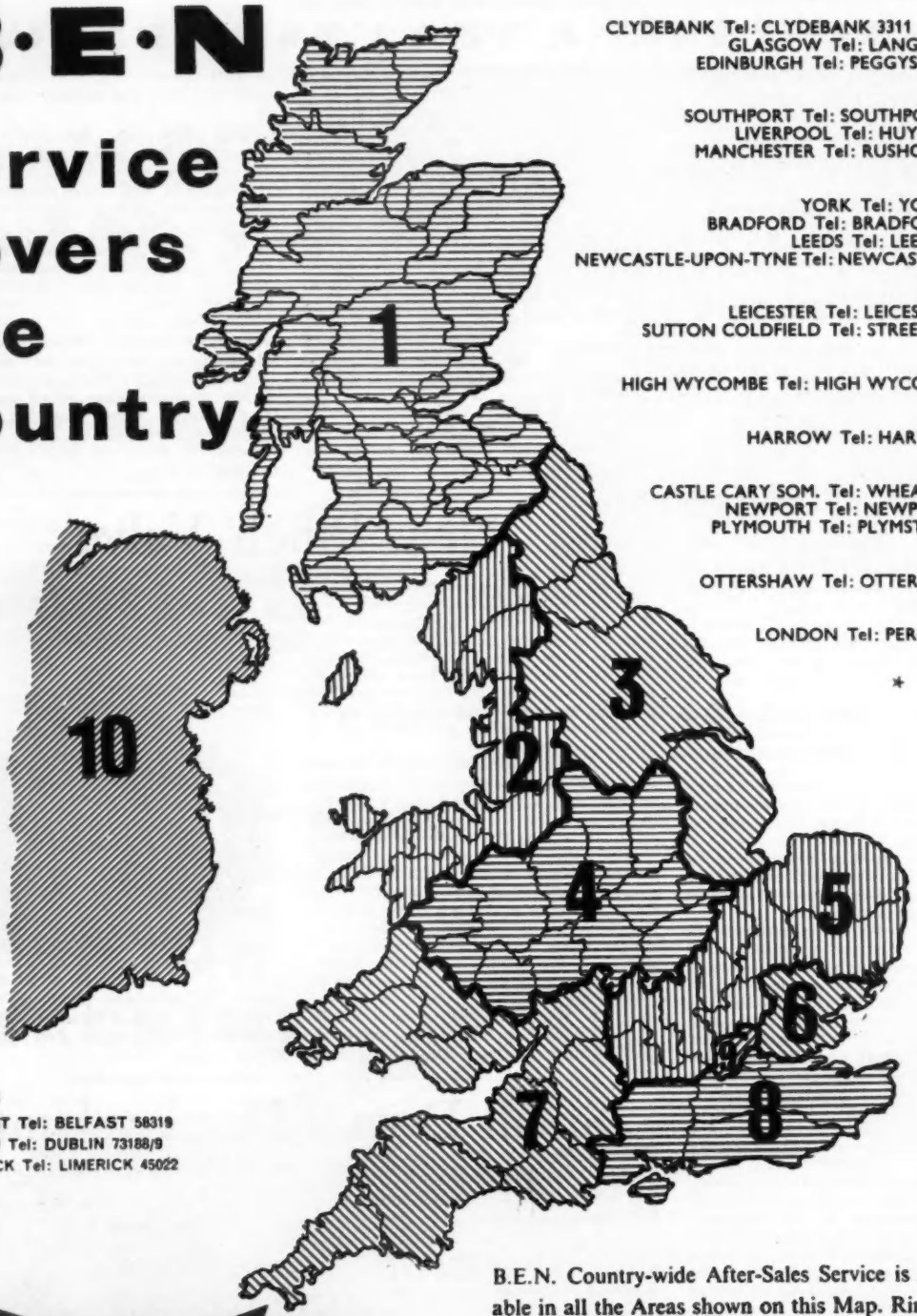

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CP.337

Design of Air Conditioning Plants

Selection of the right system for complete mills, or even in the case of single departments or sections, calls for a detailed engineering analysis of the particular conditions affecting the respective processes

By L. WALTER, A.M.I.H.V.E.

THERE are few plant designs where closest co-operation between future user and the design engineer of a new piece of plant equipment is more vital than when dealing with an air conditioning plant. This co-operation should start at the drawing-board stage for a new factory and it is extremely important before a specification is worked out for the addition of air conditioning to an existing works. How the future user of an air conditioning system can assist the design engineer in his not so easy task in preparing a layout which satisfies both, is the subject examined in this brief article. Where a future user of an air conditioning system is not sufficiently familiar with the problem, he would be well advised to entrust an unbiased engineer with the not always enviable task of co-ordinating the wishes of the user, and the financial angle to the job of the design engineer. Under these circumstances it will pay both to have this "middleman" available.

The process of controlled air treatment calls for the following functions in a plant:—

(1) **Cleaning of air by filtration. Freedom from spores and certain bacteria is an essential requirement in some uses.**
(2) **Humidifying or dehumidifying of air by addition, or extraction of moisture content of the air.**
(3) **Heating, or cooling, in order to obtain the desired air temperature and/or humidity.**
(4) **Mixing and distributing the treated air finishes the job.**

Air conditioning is a term widely used but often misunderstood and, at times, wrongly applied. For example, warm air heating of rooms or artificial ventilation by means of fans and air ducts, or blowing in of cooled air is not air conditioning. An air cooler in a room, having a filter incorporated, may supply clean cool air but it should not be called an air conditioner. Air conditioning embraces the above four main functions together, applied in such a way as to produce closely controlled conditions of cleanliness, temperature and humidity content, and draught-free distribution of air (see Figs. 1 and 2).

Makers or suppliers of air conditioning plants are frequently called upon to solve numerous problems. Although standardised units can be used, in many instances, different controlled air conditions for the various departments of a works often entail special designing considerations. Each problem demands careful analysis of the operation itself

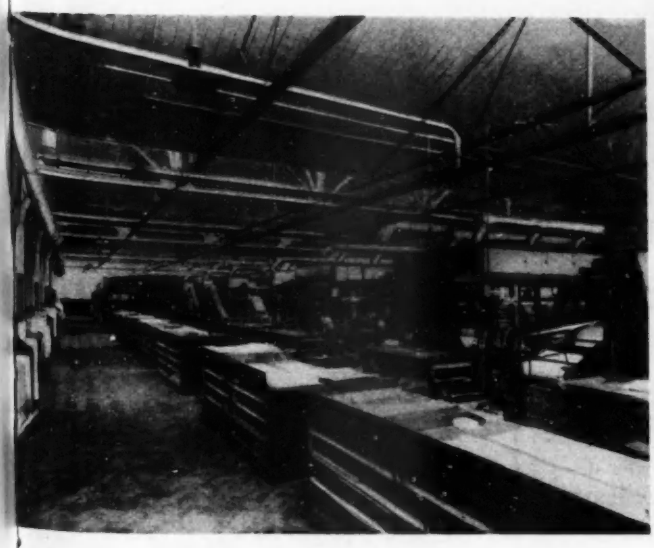


Fig. 1. Air conditioning installation in cloth finishing department

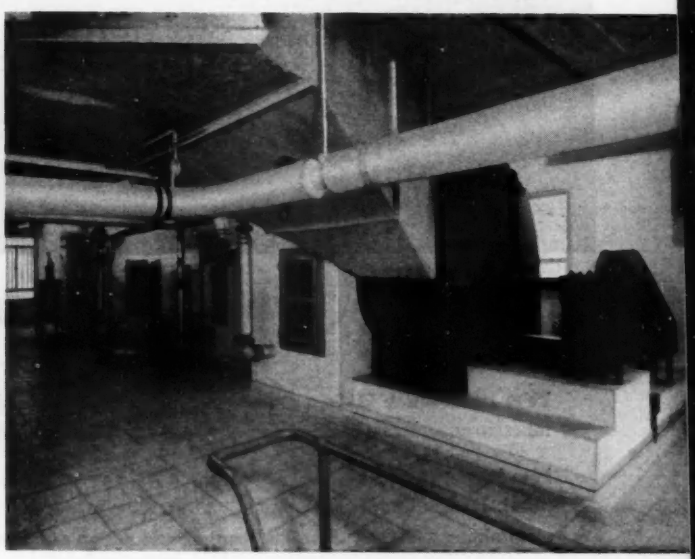
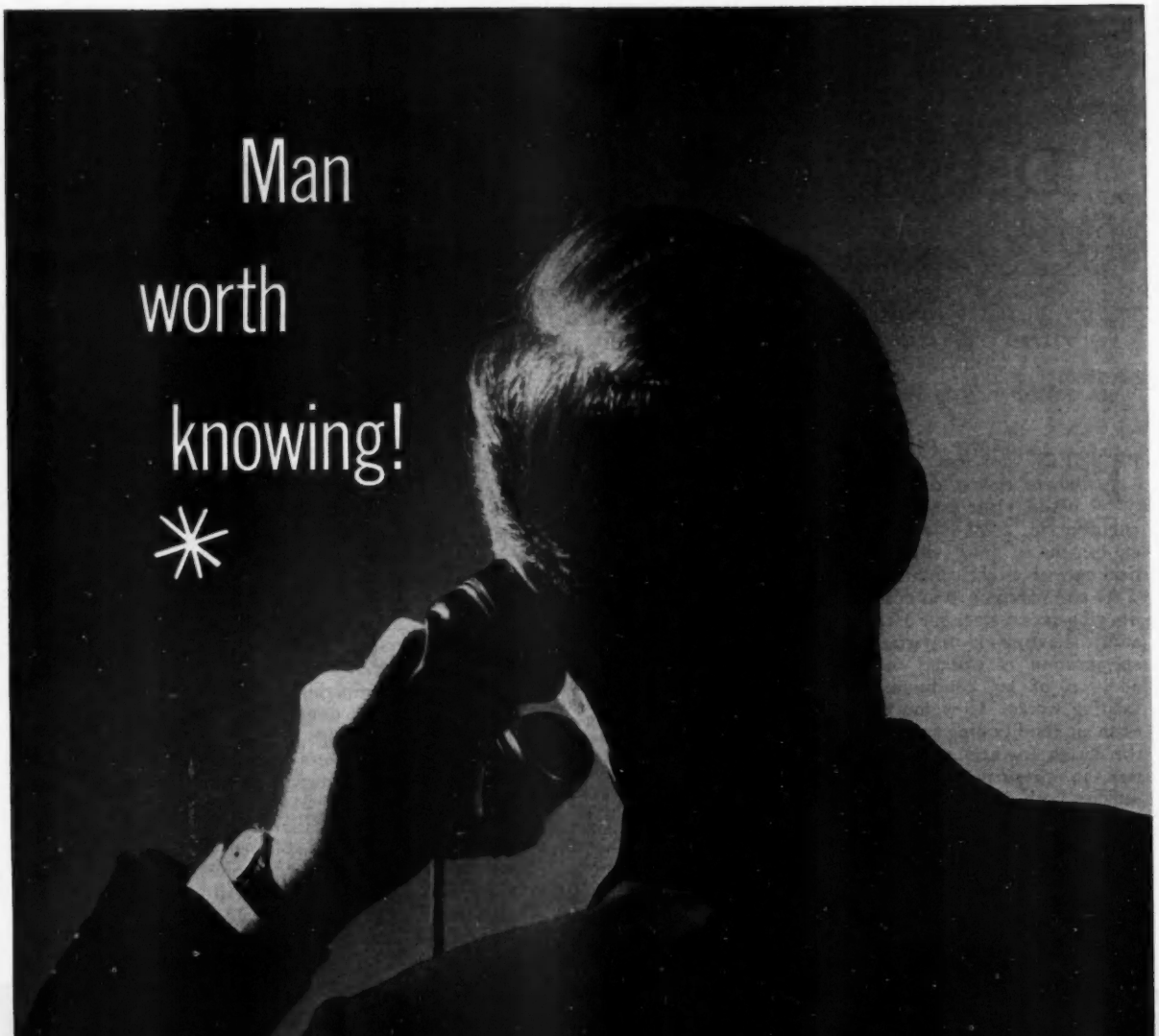


Fig. 2. View of control air conditioning station showing air washer chamber and fan (courtesy Sturtevant Engineering Co. Ltd.)



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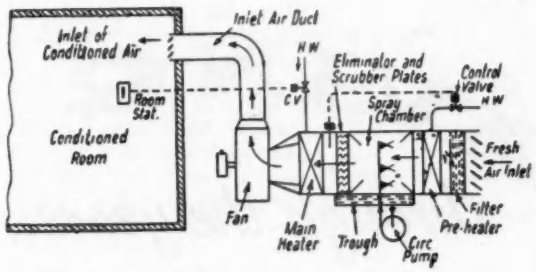

Fig. 3. Simplified diagram of air conditioning system

and the conditions under which it is performed and great experience is required from the designer and supplier of a new air conditioning system, as will be readily understood from the following observations.

Makers of air conditioning plants and units invariably investigate the existing working conditions before putting forward any detailed recommendations and quotations. Where single rooms are concerned standard air conditioning units can, in many instances, be bought "off the shelf" and installed with some success but where larger and more involved systems are needed the best procedure is to invite two or three reputable firms to examine the proposed project and quote for the job. Another excellent method where very large systems are under consideration is to entrust a firm of specialised consultants to deal with the job, although the potential user will still have to state his requirements, at least in an approximate way (see Fig. 3).

Layout Considerations

Unless a specification of the required controlled air treatment is supplied to the firms invited, great differences might arise in projects submitted by tender. One layout might make use of recirculation of air, which lowers the cost, but it may be prohibitive, e.g. where the highest purity and freedom from microbes is essential. Another offer may provide for more air changes without recirculating the air, thus being more expensive than expected. It can happen in practice that the wrong number of air changes has been assumed, thus basing all calculations and cost on undesirable assumptions. One project might use fully automatic control (which is nearly always advisable), but other quotations might have been based on hand control, thus lowering the total cost price of a new plant at the expense of later trouble with manual operation. Again one plant layout might include one or several air pre-heaters, coolers and special air filters, while another omits it, and might also omit means

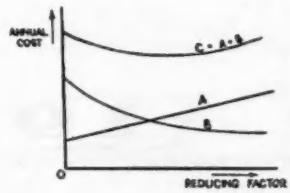

Fig. 4. Graph for obtaining economic financial expenditure. A, installation cost for new plant per annum (spread). B, cost of operation and maintenance. C, total annual cost of running plant

for correct air distribution free from draught (see Fig. 4). What then should be the guiding principles in the application of air conditioning systems in the textile and allied trades?

Obviously it is advisable for top management to know something of the definite requirements for each department, and also to know how the single elements work of which an air conditioning system is composed and their individual function within the complete air conditioning plant. By grouping these elements together, a great variety of plant layouts can then be easier understood, and their application in practice become clear. A good understanding of how an air conditioning plant works will make the final decision easier, irrespective of whether top management relies only on the experience of its own engineer and other technical plant people, or whether an expert is employed. The man who holds the purse-strings must still be able to make the final decision in a problem which is neither biological, nor chemical, nor commercial, but purely technical.

Helping the Designer

The potential user of an air conditioning system should provide all necessary data which will aid the designers to evolve the most efficient installation. The least he can do is to state his requirements clearly regarding each factor for control and, in this respect, an unbiased specialist consultant can be of considerable assistance. Much depends on close co-operation in the early stages of planning between future user and system designer. Considerable sums may be saved in first installation cost, and later in annual operational cost if the future user is familiar with the basic facts of air conditioning and also knows exactly what he requires.

When a client specifies all he wants with regard to the basic factors of air cleanliness, temperature, humidity and distribution, not to forget specification of automatic control the designer has then the most important details and can then proceed with the meticulous design of the installation (see Fig. 6). Selection of the right air conditioning system for textile mill buildings, or for single departments or plant sections depends upon an engineering analysis of the particular conditions affecting the project. It is, of course, impossible to generalise or even lay down stringent rules. The best method seems for the designer to prepare a check list of all relevant points, and to discuss these with the future user of the new conditioning system.

If an existing building is to be equipped, a prolonged study of working conditions on site is necessary, and the factory engineer can help a lot in assessing requirements. For a new building it will soon emanate from

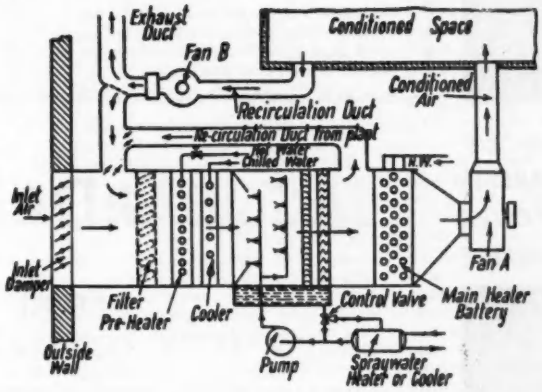

Fig. 5. Central air conditioning station employing air washer and re-circulation

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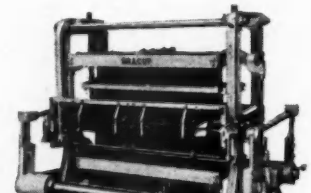
WEAVING *through the years...*

1959



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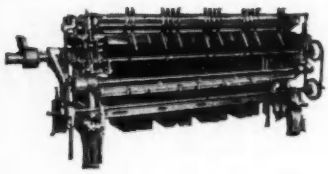

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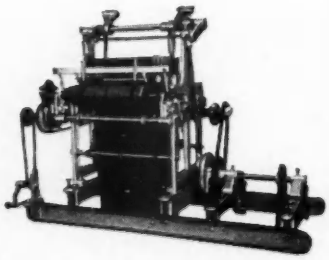
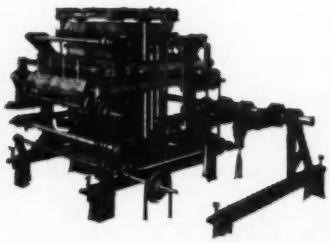


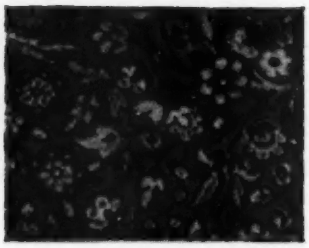
New type coarse pitch double lift single cylinder Jacquard. Available in all standard sizes. Double cylinder machines of similar design also available.



3-position Moquette Jacquard for all normal moquette weaves and special float effects.

In the year 1825 Samuel Dracup founded a Jacquard Machine business destined to become world-wide in importance. The textile industry of the world now acknowledges that Jacquard machines by DRACUP are the finest obtainable. They step up production, reduce operational overheads and have a range of pitches and capacities to meet all purposes.

We invite you to weave better, faster and cheaper with Dracup Jacquards.



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discussions with the architect or building consultant, which points have to be considered in planning the new premises. After ascertaining the basic requirements, the designer is usually left to make vital decisions. For example, whether for cooling and dehumidification to use the "dew-point" method of cooling and drying at the same time, or to use solid or liquid adsorbents (silica gel, activated alumina, etc.) for air drying and to cool afterwards separately.

Factors Governing Selection

Presence or otherwise of cooling water, a cooling piping system, cost of power, space available, weight of equipment and ease of installation are some of the factors requiring attention in addition to many others. For example, performance of the completed air conditioning system is obviously the yard-stick by which the user judges success or failure of planning. Multiple-unit systems, using several rather smaller air conditioning plants offer good flexibility and involve only one heat transfer but they are somewhat higher in first installation cost and in maintenance expenditure.

Central station systems involve two heat transfers and their flexibility may be limited. They require, however, lower first capital outlay, especially when recirculation of air, or part conditioning is permissible. In general, as the capacity of an installation increases, the choice tends to swing towards the central plant, using chilled water. The latter use increases, however, the cost of piping. With a multiple direct expansion system, less piping may be required, and also less air duct runs may or may not be achievable. The less pipework and ductwork, the less outlay for insulation will be required, which latter is a heavy expenditure item.

Another factor to decide is whether water-cooling or air-cooling should be used. With steam jet systems, water-cooled condensers or barometric types are used. With centrifugal systems, water-cooled surface condensers have to be installed. With reciprocating machines a choice is necessary between water-cooled surface condensers and evaporative condensers. Checking of assumed first installation cost, operational cost and of maintenance expenditure will give some clue to the refrigeration method to be applied. Pumping requirements and cost of water can usually be estimated by the works' engineer. Space limitations do not allow one to penetrate deeper into intricacies of choosing the right type of refrigerating equipment, but in most cases the mills' chief engineer is usually capable of stating the exact requirements in expressing his preference to the designer of a new air conditioning system.

When a project has to be worked out for a new building the architect and mechanical engineer have six major objectives to consider during planning. They are (*a*) system performance, (*b*) space, (*c*) cost of new installation, (*d*) ease of installing, (*e*) accessibility, (*f*) possibility for future expansion and neat appearance. "To be felt but not seen or heard" is the motto for the last item.

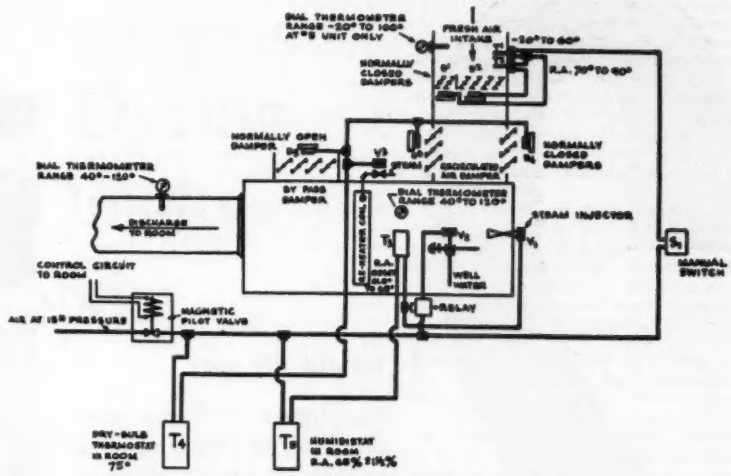

Fig. 6. Schematic control diagram

Germany:
Mohair and Wool Yarns

Mr. K. Sonderhof, Frankfurt-am-Main, Niederrad, Triftstrasse 14, is interested in representing U.K. manufacturers of mohair and wool boucle yarns in metric counts 8 - 14. He would sell on commission only and would cover the areas of Hesse, Rhineland-Palatinate, and parts of Baden. Manufacturers interested should write direct, also notify the British Consulate-General, Zeppelinalle 47, Frankfurt-am-Main.

Rhodesia and Nyasaland:
Piece Goods

W. J. Mount (Pvt) Ltd., P.O. Box 33, Salisbury, would like additional U.K. agencies to extend their range of cotton and rayon piece goods for the African market. Established in 1936, they employ nine salesmen and already represent a number of U.K., Continental and South African firms. Manufacturers interested should write direct, also notify the U.K. Trade Commissioner, P.O. Box 984, R.T.A. House, Baker Avenue, Salisbury.

Western States—U.S.A.:
Piece Goods, Knitwear, etc.

Mr. P. Wallace, 707 South Hill Street, Los Angeles, wants to contact U.K. manufacturers of cashmere pullovers and cardigans for both men and women, styled and priced for the U.S. market, also poplin and hopsack materials for trousers and suits; these may be cottons or a blend of cotton and "Terylene." Manufacturers interested should write direct giving both f.o.b. and c.i.f. prices in U.S. dollars, also copy correspondence to the British Consulate-General, 448 South Hill Street, Los Angeles 13, California.

Belgian Congo:
Cotton Piece Goods

La Cooperative du Bas-Congo-Kwango-Kwilu, B.P. 139, Leopoldville 7, want to contact U.K. manufacturers of cotton textiles. Payment would be made on letter of credit basis. They are an organisation of native African traders who buy consumer goods for their members and the society claim to have trading depots at about a dozen places outside Leopoldville. Manufacturers interested should write direct—correspondence may be in English—also notify the British Consulate-General, B.P. 8049, Leopoldville, Belgian Congo.

Canada:
Nylon Parachute Cloth

The United Kingdom Trade Commissioner at Ottawa has informed us that the Pioneer Parachute Company of Canada Ltd., Box 280, Smith Falls, Ontario, a United States Subsidiary, require urgently, for tendering purposes, offers from U.K. manufacturers to supply 130,000 yards nylon cloth for parachute canopies British Standard Specification D.T.D./793, 36 ins. wide natural colour. Scheduled deliveries over 6 to 8 months. The first 10,000 yards within 60 days of June 24.

Manufacturers interested in this inquiry are requested to cable their quotations as soon as possible direct to the Purchasing Agent, Pioneer Parachute Company of Canada Ltd.

It would be appreciated if, at the same time, they would notify the U.K. Trade Commissioner, 56 Sparks Street, Ottawa, that they have done so.

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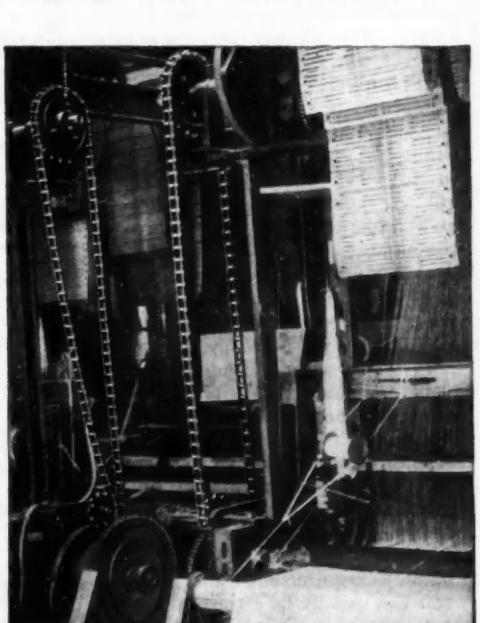
Standardised chain and guide pinion sets for directly replacing existing lift tackle — eliminate shut-downs for adjustment — no hold-ups due to dropped heald shafts — no variation in length, regardless of humidity or temperature.

2 MARK 5 Jacquard drives

Stock roller chain drives for single or double lift Jacquards —the corrosion resistant roller chain transmission that eliminates mal-timing of Jacquard, absorbs minimum power, and ensures smooth operation, fewer harness breakages and a better weave.



RENOLD CHAINS LIMITED • MANCHESTER

Guild of Technical Dyers

Impact on the Dyeing Industry of Quality Tested Goods*

By R. C. GREENLEES†

QUALITY control in industry is not new. It has been practised individually and collectively for many years and the textile trade is no exception. Within living memory it was common practice for individual dyehouses to maintain an air of secrecy over the processing methods used, in the belief that it would enable them to produce a product superior in fastness and appearance to their competitors. By these methods a great deal of the potential value of quality control was lost in that there was no accommodation for the co-ordination or maintenance of the standards required. However, advances in technical knowledge, due in no small measure, to the progress of science has considerably broadened the outlook of the trade.

In 1937 Courtaulds Ltd. launched a scheme to formulate and co-ordinate standards which would be acceptable to consumer and manufacturer. Development of this scheme had to be discontinued during the war and was not reintroduced until 1954. At first operated on a restricted scale, it has expanded and it is now the yard-stick used by many sections of the industry. The re-development of the scheme was largely associated with the demand for assistance in establishing the trade in gaberdine made from "Fibro" on a sound basis to give consumer satisfaction. At that time a serious position had arisen in that a good fabric was in danger of being discarded due to bad finishing.

Although other quality control schemes are operated by various companies, both in the U.K. and abroad, Courtaulds tested quality plan is probably the most comprehensive. During the war, the need for quality control was recognised and was expressed through the government sponsored utility scheme.

Quality control is the maintenance of a degree of consistency acceptable to the consumer and manufacturer alike. Such consistency can only be obtained by the adoption of appropriate standards, but it should be borne in mind that the adoption of standards higher than is necessary can introduce technical difficulties; the cost rises disproportionately and becomes uneconomic. Quality control has to trace the difficult central course between effectiveness and extravagance in monitoring the product. Its logic is concerned with refuting the dilemma of losing either profitability or goodwill.

Quality control does work but the road to success can be long and arduous and the key to success is to be found in a thorough knowledge of the standards required and of the tools ranging from chemicals and dyes to the machinery used for their application. It cannot be emphasised too strongly that the standards required are usually minimum ones and any downward tolerance is extremely small. Consistency of performance, therefore, demands that the required standard is maintained at every stage during production.

Quality control works because its adoption eventually leads to consumer satisfaction, resulting from more efficient technical control which means lower costs due to increased production. One of the weaknesses of any tested quality scheme lies in the fact that samples submitted are not always representative of succeeding batches. Such failure can generally be found out and its source readily traced. In considering the adoption of a tested quality scheme, the first step is the easiest, in that agreement is soon reached that a good scheme is necessary and advantageous to all concerned.

Standards

The implementation of a T.Q. scheme is not as straight forward in that a dual approach is necessary. On the one hand, the standards required must be established, and on the other there must be technical methods of producing goods which comply with the standards coupled with suitable methods of testing. The position regarding the adoption of any standard is still somewhat fluid and, in the absence of official legislation, specific standards can not be internationally enforced. The standards used today are those agreed between the interested parties as minimum requirements necessary to give consumer satisfaction. However, sufficient information is already available to enable all to lay down standards that provide a sound operational basis on which to build on in the light of future experience.

In the selection of test methods to ensure a fabric meeting the required standards of fastness, reference should be made to the work carried out on fastness testing by the S.D.C. (3rd report) and other textile bodies. The value of fastness testing can be undermined if it becomes purely routine with complete lack of supervision. It is a good plan to periodically change around the personnel concerned with fastness testing. Although test methods are of considerable assistance in the fastness assessment of fabrics, additional useful information is continually being acquired from results obtained under actual consumer conditions. In fact, considerable difficulty can at times be experienced in the correct interpretation to be put on test results. An example of this was the abrasion results obtained on two pairs of trousers. In one the duty factor and the Martindale test results were poor, while in the other the duty factor was poor and the Martindale good. In deciding the correct interpretation to be put on these results, the type of fabric was taken into consideration and in this case the Martindale tester was considered more applicable. Subsequent events proved this correct as the first pair of trousers quickly broke down in consumer wear, while the second pair was satisfactory.

Another important point is to ensure that the methods used for fastness testing are always strictly adhered to. If this is not done, variable results in the simplest tests can be obtained. For instance, varied procedure in carrying out a washing test can produce serious discrepancies in the results. The dyer must therefore concern himself with the problem of fastness testing and its assessment, in addition to his main job of dyeing and finishing of textiles.

The impact of T.Q. goods on the dyeing industry has resulted in many of the smaller firms either creating or enlarging existing laboratory facilities and, at the same time, greater demands are being made on the large companies for technical service. Courtaulds have long been aware of this increasing demand and facilities are available for technical assistance to all branches of the textile industry.

In recent years pleated outerwear fabrics composed usually of "Tricel" in blend with other fibres such as "Fibro," cotton and wool have been in considerable demand. This has created new problems for the dyer and finisher since the dyes and finishes used have to withstand a pleating and/or setting treatment. Only by careful selection of the dyes used can objectionable shade changes be avoided or kept at a minimum in these processes. It is not claimed that T.Q. is fully responsible for the upgrading of fabrics and their processing but in many cases a measurable part has been due to T.Q. The existence of a T.Q. scheme can be used to measure the suitability of new fabrics and/or fabrics subjected to new processes for particular end uses.

One point which should be clearly understood about any T.Q. scheme is that the merchandise has been designed and processed with the object of satisfying certain tests which fact is already common practice in other industries. A fabric carrying a T.Q. label or mark should convey to the consumer that it will give satisfactory service provided the intended conditions of usage are not exceeded. The impact on the dyeing industry is that greater importance must be attached to the end use of any fabric or yarn received for dyeing and finishing. Arrangements should be made to ensure that this information is made available to the dyer and finisher, in order to select the method of dyeing and finishing necessary to enable the fabric or yarn to meet the required standard of fastness. The success of a T.Q. scheme largely depends on this information being available to the people concerned at the time required. It should be accurate and definite and should not demand unnecessary fastness requirements because

* *From a paper given recently to the Guild of Technical Dyers at Batley.*

† *Courtaulds Ltd., Coventry.*

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- Tested and proved throughout the world
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- No need to season them or stock for long periods thus reducing customers capital outlay
- Greater consistency of, and control over shuttle flight
- Saving in man hours required to replace pickers, or re-adjust, clean and re-set them, etc.

★ *Sole manufacturers of BETA Buffalo Hide Pickers and Buffalo Hide Accessories and BENKA Leathers*

★ *Costruttori esclusivi dei tacchetti BETA di pelle di buffalo e di accessori di pelle di buffalo e di pellami BENKA*

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such demands can increase the technical difficulties as well as cost. An example of this is the demand for high fastness to light and washing when one of these would be sufficient to give consumer satisfaction. One factor that should not be overlooked is the fastness of trimmings intended for attachment to garments. Their fastness properties should match those of the parent garment.

The impact of T.Q. goods on the dyeing industry has compelled the dyer to give greater consideration to the precise standard of fastness obtained in his work, in that it is no longer satisfactory for goods to leave the factory carrying an assumed standard of fastness. With the introduction of man-made fibres and the varied conditions of their dyeing and finishing, some of which can easily be unintentionally varied, the demand for fastness testing has increased enormously. Obviously, there should be a parallel development of works practice and laboratory facilities.

Consumer Attitude

There are instances where dyers are willing to pay for a certificate of fastness from an independant test house rather than accept one free of charge from one of their suppliers. Similar demands are being made by retail shops. Even the consumer is rapidly becoming aware of the benefits of T.Q. goods as reflected by the increased demands being made by him on independent test firms for an evaluation of his purchase. T.Q. goods have been given a further impetus by the example of a well-known firm who have promoted it through every phase right to the retail shop, and all who supply goods to them are aware that fastness requirements run parallel with all other demands. On the other hand, some manufacturers of well-known branded merchandise have, due to the regularising of T.Q. goods, been compelled to re-examine standards which have been accepted for years. In addition, many mail order firms have taken advantage of T.Q. goods.

The dyer should not assume that T.Q. means all give and no take. This is far from the truth as T.Q. has done much to iron out the anomalies in the standard of fastness demanded, by upgrading in the cases where the fastness was too low, and downgrading where it was too high, thus bringing about a more rational state of affairs.

There are instances where it has been found impossible to meet the required standard of fastness. An example is in pale shades on "Fibro" fabrics for sports shirts. The difficulty is in the lack of adequate light fastness. The best approach is through the use of the most suitable dyes available and here consideration could be given to the reactive dyes.

A point of direct concern to the dyeing industry and the industry as a whole is the experience related by a certain testing establishment when undertaking new contracts for T.Q. In the initial period the percentage rejection is high, but this in time falls to a reasonable figure as a result of co-operation between those concerned in the production of the goods. This would appear to indicate that scope for improvement is there, but advantage is not taken of it due, in many cases, to ignorance of the true situation.

A survey of all fastness requirements showed that on testing the two most frequently at fault are light and dimensional stability. Considerable correction of the former can be obtained by careful selection of the dyes and finishes used, while the latter will often respond to improved finishing conditions. It is recognised that on occasions the lack of dimensional stability can be due to unsuitable fabric construction, which finishing will not correct. It is apparent that a study of fastness results can pin-point for the dyer and finisher weaknesses in his production line, and thus allow him the opportunity for correction.

Today, the consumer is perplexed with the wide range of yarns and fabrics from which to choose. The retailer is also puzzled with the wide range of fabrics today compared to yesterday. The maker-up finds a similar state of affairs, likewise the dyer and finisher finds that he has to cope with the problem of assessment and selection from a vast list of dyes and finishes and their varied methods of application. All are looking for something which will resolve the problems so as to give them a clearer vision of where they are going. The answer which is becoming increasingly evident is quality control which in turn must force on the industry the need for greater technical efficiency.

Rapid Transportation of Modern Machinery

SWISS Air Lines recently flew into Manchester several of the latest Schweiter automatic pirn winders. These machines—averaging 16 ft. 8 ins. × 3 ft. 11 ins. × 4 ft. 4 ins.—weigh approximately 1½ tons, and for this purpose Swissair have used their special DC6A "Cargoliner" which operates a regular service from Switzerland to New York by way of Manchester. The winders are completely assembled before loading into the aircraft and can be put into production in this country within 24 hours of leaving the Schweiter plant at Horgen. Another factor is that practically no packing is required and insurance premiums are stated to be lower than for surface methods of transport. The most recent machine was delivered to the Oxenhope mills of Heild Brothers of Bradford, who, it is reported, intend taking delivery of further Schweiter machines through Swissair. Livesey and Aspinall Ltd., Manchester, the U.K. agents for Schweiter, arranged for this quick and very efficient method of transportation.

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A Regular Yarn.

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TEXTILE MACHINISTS
SINCE 1846

James Mackie & Sons Ltd

BELFAST
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CARPETS

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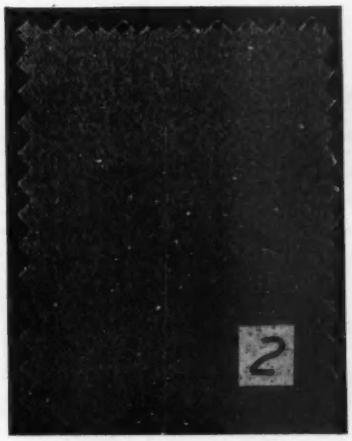
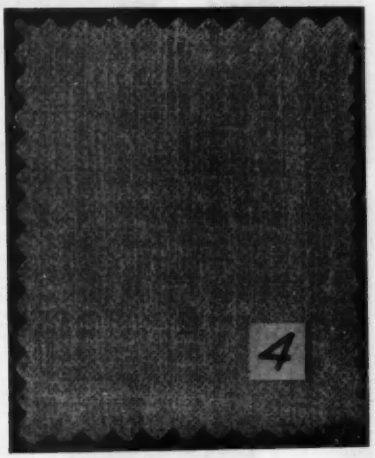




Light-Weight Fabrics

(*continued from page 372*)

variety of finishes could be applied to such a base owing to the inclusion of the raising process so often avoided when weaker, light-weight fabric is being processed.

(3) Specification as (2) except 2/2 twill, 70 picks and finished width of 35 ins.
Weight 3¼ ozs. sq. yd.
Tensile Strength (7 ins. × 4 ins.) { **Warp—150 lbs. at 20% extension** / **Weft—125 lbs. at 17% extension**

Softer handle than Fabric 2. Tends to reveal the nylon support in a cross dye rather more than the plain weave version.

(4) Warp 48 w.c. "Fibro," 20 "Z" 30 den. nylon } 15 "Z"
Ends 52 per in.
Weft as warp
Picks 48 per in.
Weave Plain
Width Reed 40 ins. for 36 ins. finished
Weight 3 ozs. sq. yd.
Tensile Strength (7 ins. × 4 ins.) { **Warp—120 lbs. at 21% extension** / **Weft—130 lbs. at 40% extension**

The surface appearance of this structure is largely dominated by the highly twisted "Fibro" effect thread and in many ways is more attractive than a flatter cloth. The extensibility of the nylon is seen at its best in the high weft extension at break.

(5) Specification as (4) except 2/2 twill, 52 picks and 35 ins. finished width.
Weight 3¼ ozs. sq. yd.
Tensile Strength (7 ins. × 4 ins.) { **Warp—150 lbs. at 25% extension** / **Weft—130 lbs. at 30% extension**

In the above setting, the cloth looks rather lean but could be improved if woven 64 ends and picks. A good basis for printing.

(6) Warp 48s w.c. "Fibro," 70% wool 30% 20 "Z" 30 den. nylon } 15 "Z"
Ends 52 per in.
Weft as warp
Picks 48 per in.
Weave Plain
Width 40 ins. reed for 36 ins. finished
Weight 3¼ ozs. sq. yd.
Tensile Strength (7 ins. × 4 ins.) { **Warp—120 lbs. at 21% extension** / **Weft—130 lbs. at 40% extension**

As would be expected, the softening influence of wool enhances the handle of this cloth and counteracts the hardening effect of high twist.

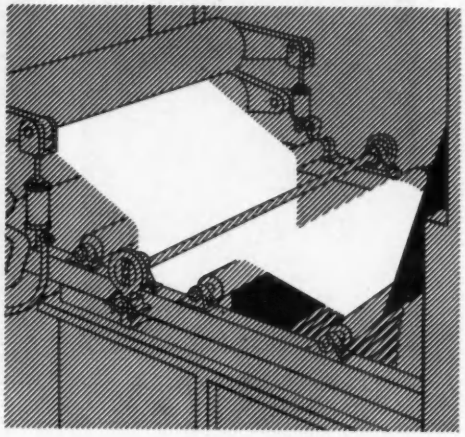
(7) Specifications as (6) except 2/2 twill, 52 picks and 35 ins. finished width.
Weight 3¼ ozs. sq. yd.
Tensile Strength (7 ins. × 4 ins.) { **Warp—150 lbs. at 24% extension** / **Weft—130 lbs. at 37% extension**

The set of this cloth could be increased to 64 ends and picks if the additional weight would not be detrimental, although, in the setting given there would be little danger of thread slippage.

(Acknowledgment is paid to Courtaulds Ltd. for production of yarns and fabric.)

FARMER NORTON

Typical open-width washing machine, incorporating the vibrating wedge, for effective washing of cotton, woollen or nylon fabrics at high speeds without tension or creasing.



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Two-Bowl Hydraulic Calender for embossing, frictioning or schreinering. Can also be adapted for the schreinering of nylon.

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ADELPHI IRONWORKS, SALFORD 3, MANCHESTER
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Book Reviews

NEW FLAMEPROOF CLOTHING STANDARDS. B.S. 1547 : 1959—Flameproof industrial clothing; B.S. 3119 : 1959—Method of test for flameproof materials; B.S. 3120 : 1959—Performance requirements of materials for flameproof clothing. British Standards Institution, 2 Park Street, London, S.W.1 (price 3s. each).

These three standards relate to:—

(1) The requirements with which articles of industrial clothing must comply before they may be called "flameproof."
(2) The performance requirements by which the flameproof qualities of materials may be judged.
(3) The method of test which is to be employed in assessing these performance requirements.

All these subjects of standardisation were previously contained in one standard, B.S. 1547, *Flameproof industrial clothing*. When this standard was recently revised it was decided to divide it into three separate standards. This division now aligns the standards for performance and testing of flameproof materials with the new standard for "materials of low flammability" in B.S. 3121. In this way, materials resistant to flame have been standardised in a much wider sense than heretofore.

* * *

1958 BOOK OF STANDARDS, including TENTATIVES. Part 9—Plastics, Electrical Insulation, Rubber, and Carbon Black. American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. (price 14 dollars).

Despite the fact that the Book of A.S.T.M. Standards is printed on bible paper and divided into ten parts containing 2,450 specifications, methods of test, definitions of terms and recommended practices, it would appear likely that further division will soon be necessary if the present rate of growth continues. Part 9, with its 290 standards and its excellent index, has over 2,000 pages of information invaluable to a wide range of industries and well-arranged for ease of consultation, e.g., the Table of Contents is presented in duplicate—one a list of standards classified by materials covered and, second, a list of standards in numerical sequence by serial designations. Supplements to the 1958 Book of Standards will be issued in 1959 and 1960.

* * *

A COMPARISON OF THE U.K. TARIFF AND THE PROPOSED TARIFF OF THE EUROPEAN ECONOMIC COMMUNITY. Federal Trust, 10 Wyndham Place, London, W.1 (price 10s.).

External tariffs are one of the biggest stumbling blocks in the way of co-operation between the U.K. and the Common Market six in a free trade area. The object of this report is to describe the similarities and differences between the U.K.'s existing tariff and the E.E.C. tariff as it will be at the end of the transition period, i.e., around 1970/2, when the single external tariff of the Common Market has been established, thus providing the data necessary to form a considered opinion of the importance of the differences that exist and the possibilities of reconciling them. Besides including a detailed review of tariffs on imports of raw materials and fuels, the report provides comparable figures of U.K. imports from the Commonwealth and other sources in 1956 and, in the case of raw materials, statistics of E.E.C. imports also. It demonstrates that U.K. and E.E.C. tariffs are nil on trade to the value of approximately one quarter of U.K. imports in 1956, that they are fairly similar on 18% of trade, that a further 18% of trade consists of items on which E.E.C. tariffs are still to be negotiated. It also points out that in a free trade area about one-fifth of U.K. imports of foodstuffs and raw materials and over half its imports of manufactures could be expected to enter Britain duty-free from other European countries.

* * *

STANDARD HANDBOOK OF TEXTILES. A. J. Hall. Fifth edition, 1959. National Trade Press Ltd., Carlton House, Great Queen Street, London, W.C.2 (price 35s.).

This work was first published in 1946 and its worth has been proved by the demand for new editions maintained by steady interest. Each successive edition has incorporated new developments in machinery, processes and materials so that students wishing to acquire an all-round knowledge of textiles have available up-to-date and expert guidance. This new edition contains, in six chapters, an introduction to textile fibres and their properties, the conversion of fibres into yarns and fabrics, and all subsequent processes. There are 213 illustrations, many of them depicting new machines and new material has been introduced in explanation of such innovations as high bulk and stretch yarns and new fast-colouring dyeing methods and resin finishes. There is a misprint in the list of contents on page 5 but it does nothing to lessen the value of this volume to students and others.

* * *

AN ECONOMIC SURVEY OF THE SISAL INDUSTRY OF TANGANYIKA. C. W. Guillebaud. James Nisbet and Co. Ltd., Digswell Place, Welwyn, Herts. (price 15s.).

The economic prosperity of Tanganyika depends to a great extent on the sisal industry, which originated with the introduction from Florida of the plant by Dr. Richard Hindorf in 1892. This economic survey by an author distinguished by his ability and experience in investigations in many fields, is of exceptional interest, as it is probably the first serious and exhaustive study of a hard fibre industry and is based on unrestricted access to all necessary facts, figures and evidence. Early chapters show how sisal has grown in importance among the hard fibres and the industry's expansion in Tanganyika and other countries, together with a discussion of the course of sisal prices and the relationship between production and consumption. The labour problem is most acute because of the native attitude to work and leisure, although much has been done to attract and retain workers by increased cash payments and the provision of free housing and medical services. The author brings out most clearly the employers' difficulties in dealing with such a backward and primitive labour force.

Chapter V describes the organisation of the sisal market and the return received by growers after marketing costs and the cess levied on all sisal production for the general benefit of the industry have been paid. There are many statistical tables and graphs to support the main text. The foreword was written by Sir Eldred Hitchcock, probably the outstanding personality in the sisal industry and a great worker for the economic wellbeing of Tanganyika, who died recently. The survey is due to the initiative of the Tanganyika Sisal Growers' Association.

C.L.W.

* * *

YORKSHIRE TEXTILE INDUSTRY, 1959. John Worrall Ltd., Central Works, Oldham (price 30s.).

Prospective buyers and sellers will find details of Yorkshire textile undertakings admirably arranged for rapid consultation in the latest issue of this reliable directory now containing over 600 pages.

An alphabetical index to firms and an index to towns and villages enable the user to trace mills either by name or location and a classified list of trades gives the key to type of goods supplied.

In Sections A to D of the buyers' guide names of suppliers of machinery and accessories, chemicals, oils, raw materials and piece goods can readily be found. Education, commercial and statistical sections supply addresses and other details of organisations concerned with the industry and tables showing production and consumption figures. A list of holiday periods for towns in the area is a useful feature.

S.P.S.

* * *

MAKING FOOTWEAR WITH RUBBER. Public Relations Dept., Dunlop Rubber Co. Ltd., St. James's House, St. James's Street, London, S.W.1. The partial replacement of cotton by "Terylene" in the manufacture of rubber footwear is referred to in this new Dunlop publication. The booklet, which describes the fabrics in use, outlines the history of the footwear industry and the revolution caused by the introduction of rubber in 1840. Modern manufacturing processes are described and illustrated. It is one of a series obtainable from the educational section of the company.

* * *

CRABTREE ELECTRICAL HANDBOOK. J. A. Crabtree and Co. Ltd., Lincoln Works, Walsall (price 5s.).

An entirely new edition of this extremely useful publication—running to over 400 pages—includes the introduction of new wiring materials and methods; the appearance of many new British Standards; changes in regulations; the extensive developments in Crabtree wiring accessories and protective and automatic control gear, etc. A number of sections have been added and the reference tables have been expanded. This latest edition is lighter and less bulky than its predecessor. This has been achieved by the use of a new kind of bible paper and a plastic binding.

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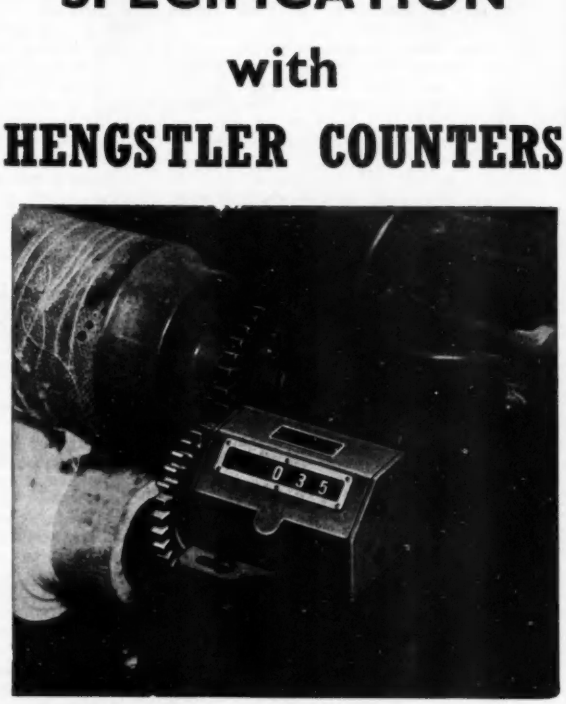

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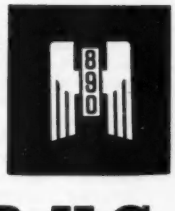


J. HENGSTLER, K.G.,

Aldingen, Kr. Tuttlingen

W. Germany

3rd International Textile Machinery Exhibition, Milan
12—21 September, 1959, Section F, Stand No. 6349

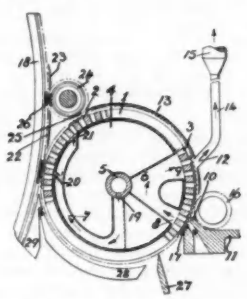
RECENT TEXTILE PATENTS

These abridgements are republished from specifications by permission of the Controller of H.M. Stationery Office. The full specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2. Price 3s. each.

791,339 Controlled Air Currents in Cotton Card

L. W. TSING, *East Sun Textile Co. Ltd., 421 To Kwa Wan Road, Kowloon, Hong Kong.*

Describes an improved carding engine. The taker-in cylinder 1 is perofrated with radial perforations 3, which are uniformly distributed to provide a free passage for air currents. In the taker-in is a damper 4 to control the air currents within the cylinder. The damper is made of thin plates fixed on a stationary shaft 5 and is composed of a suction duct 6 and a pressure duct 7. The inlet 8 of the duct 6 is adjacent to the nose 10 of a dish plate 11, and the outlet 9 is adjacent to an opening 12 in a cover plate 13. Connected to the opening 12 is an exhaust conduit 14. An air blower (not shown) is connected with the carding engine by joining the inlet of the blower with the pipe 15 of the exhaust conduit 14 for the purpose of producing desired suction. Above the dish plate there is a feed roller 16. The length of the nose 10 of the plate is shortened to about one half of an inch and a curved baffle 17 is placed below the nose. An opening of about one fourth of an inch is formed between nose 10 and baffle 17 to provide



an inward passage for air currents. In operation, air currents, passing through perforations 3 sets up a sucking effect which causes the fibres in the zone of nose 10 and baffle 17 to adhere to the saw-teeth on the taker-in. An additional air current is provided inside the taker-in to pass out through the perforations 3 near the point of common tangent of the taker-in and the cylinder 18. The shaft 5, having holes 19 about one fourth of an inch in diameter is connected with pipes (not shown) at both ends, and these pipes are again connected to the outlet of the air blower, A current of air under pressure is then set up in the pressure duct 7 passing through the holes in shaft 5, and blows out at the outlet 20, to aid the transference of fibres. The back plates 22 and 23 are spaced part and a clearer 24 is placed between them. The needles 25 on the clearer are inclined in the opposite direction to the saw-teeth of the taker-in, but in the same direction as the needles on the cylinder. When the clearer revolves in an anti-clockwise direction it acts to strip the fibres remaining on the taker-in surface with the aid of the air current passing through the perforations on the taker-in from another outlet 21 of the pressure duct 7, which outlet faces the clearer. The fibres stripped from the taker-in are finally transferred to the cylinder from the clearer because of the needles on the clearer being inclined against the direction in which the clearer rotates.

797,173 Treatment of Cellulosic Fibres

NATIONAL LEAD CO., 111 *Broadway, New York* 6, *U.S.A.*

Improved method for treating cellulosic materials with treating agents of various kinds such for example as dyes and flame-proofing agents to improve the efficiency of such agents. This comprises contacting the fibres with a solution of a halide of titanium, wherein the titanium has a valence less than 4, and simultaneously or subsequently with the treating agent. Following is a description of methods of carrying the invention into effect.

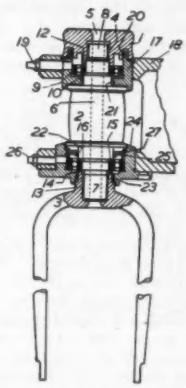
Metal Salt Colouring Treatment.—To a solution comprising 10 grams per litre $TiCl_3$ calculated as TiO_2 was added 200 grams per litre $CrCl_3$ (equivalent to 100 grams per litre Cr_2O_3). A piece of 12 ozs. per sq. yd., starched, sized, enamelling cotton duck was impregnated with this solution so that cloth pick-up was approximately 100%. The fabric was then exposed to air in 5 mins. at room temperature, and was blue-green in colour. It was then neutralized in 150 grams per litre solution of Na_2CO_3 for 5 mins. at room temperature and the neutralized cloth went from green to brown to black in colour in 3 mins. The cloth was then washed and dried in air which resulted in an impregnated cloth of a pleasing green colour. During impregnation, the fibres became highly swollen and were quickly penetrated. After washing and drying, fibres were removed from the fabric and examined under an optical microscope. Penetration of the solution was found to be uniform through the fibre as evidenced by the even, green colour. This was repeated except that the solution used did not contain $TiCl_3$. A dark green cloth was produced only after prolonged treatment (30 mins.) and microscopic examination showed the fibres to be very poorly penetrated.

Sizing Treatment.—A solution containing 2% low molecular weight hydroxyethyl cellulose and also containing 5 grams per litre $TiCl_3$, calculated as TiO_2 was paddled on a herringbone cotton twill. The cloth was neutralized in a 20 grams per litre Na_2CO_3 solution, squeezed and dried throughly at 110°C. The fabric was then soaped to rid it of excess material and rinsed and dried. A heavily sized fabric resulted. Fibres from the fabric were examined under an optical microscope and penetration of the solution was found to be uniform throughout the fibre.

797,214 Improved Flyer Assembly for Spinning or Twisting Machines

FAIRBAIRN LAWSON COMBE BARBOUR LTD., *Wellington Foundry, Leeds.*

Describes an improved and cheapened mounting and driving mechanism for a flyer. A flyer assembly consists of a hand grip 1, a wharve 2 and a flyer leg 3. The hand grip is threaded internally at 4 and has a flared hole 5 through which yarn passes. The hole is continued through the assembly by the holes 6 and 7 formed in the wharve and leg respectively. The thread 4 engages with another thread formed on the end 8 of the wharve, forming a junction, and a ball race 9 is placed against a shoulder 10 formed on the wharve. A ring 12 turned on the lower end of the hand grip engages with the



inner ring of the ball race, clamping it against the shoulder 10. The outer ring of the race 9 is a tight fit in the ring 17, which is fixed to the flyer rail 18. The rail 18 is provided if required with a grease nipple 19. A similar construction is seen at the lower end of the wharve where the leg 3 is provided with a threaded portion 13 which engages with a thread formed on the lower end of the wharve. A ring 14 in which the leg terminates, engages with the inner ring 15 of a second ball race, locking it against a shoulder 16 formed on the wharve. In order to prevent dust from entering the top bearing, the ring 17 is provided with labyrinth traps 20, 21. Similar labyrinths are formed at 22, 23 in a lower ring 24 and inner ring 25, and grease nipple 26 supplies lubrication to the bearing 15. The ring 25 is held in place by a spring ring 27.

797,382 Improved Pirn Winding Machine

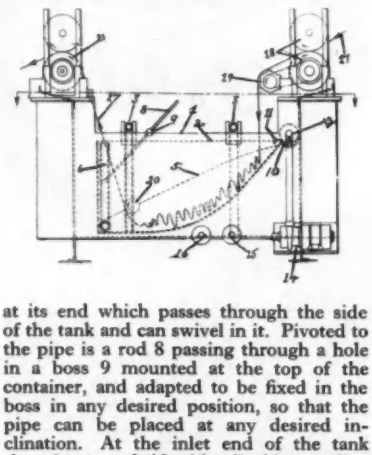
ETIENNE MOTTE FILS AND CIE and J. C. M. J. MOTTE, *Cours, Rhone, France.*

Improved pirn winder in which the continuous formation of cops is achieved through a novel method which consists in forming a gap between the successive cops through a relative movement of the cop which has just been produced with refer-

ence to the spindle or the pressure cone. This has a dual purpose in the shaping of a cop and the translational shifting of the latter over its spindle, so that it is possible to cut the thread between successive cops and to remove the formed cop thus separated. The separation between the successive cops may thus be obtained automatically or manually while the lifting of the finished and separated cops is allowed as well during operation as during a stoppage of the spindle.

797,538 Continuous Dyeing Machine
BRITISH COTTON AND WOOL DYERS' ASSOCIATION LTD., 22 *Cumberland Street, Manchester.*

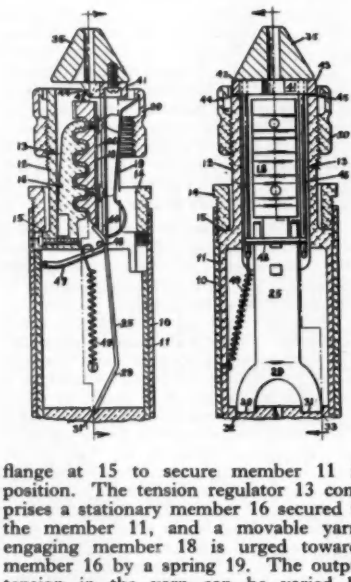
A continuous dyeing machine in which materials can be treated while not under tension or pressure, while at the same time providing for the process liquor to flow through the relaxed yarn, and in which the processing time may be made considerably longer. The machine has a container 1, in which a tank 2 is suspended by means of lugs 3 which are attached to channels secured to the sides of the tank and rest on the edges of the container. The tank has partitions 5 dividing it into longitudinal compartments, the upper edges of the partitions sloping down towards the outlet end. The bottom of the tank is inclined from the top of the tank at the inlet end to the outlet end where the tank has its greatest depth. Near the bottom of the tank there is an outlet pipe 6 with a bend



at its end which passes through the side of the tank and can swivel in it. Pivoted to the pipe is a rod 8 passing through a hole in a boss 9 mounted at the top of the container, and adapted to be fixed in the boss in any desired position, so that the pipe can be placed at any desired inclination. At the inlet end of the tank there is a trough 10 with a lip 11 extending over the edge of the tank, and above the trough is a spray pipe 12 to which dye liquor is supplied through a pump 14 from an outlet 15 at the bottom of the container. An outlet 16 is provided for draining the container when required. Liquor sprayed into trough 10 flows over its lip into the tank. Warps 17 fed into the machine by a pair of nip rollers 18 and a wince 19 fall into the compartments and are washed down the sloping bottom of the tank by the liquor overflowing from trough 10. The warps lie loosely on the bottom of the tank and pass under a tube 20 and up to a pair of nip rollers 21, from which they may pass to another unit or to further processing equipment. The nip rollers 18 and 21 are independently driven, so that warp can be fed into the tank before any is withdrawn, to adjust the time of immersion.

797,601 Tension Regulator for Twisting Machines
DEERING MILLIKEN RESEARCH CORPORATION, *P.O. Box 27, Pendleton, South Carolina, U.S.A.*

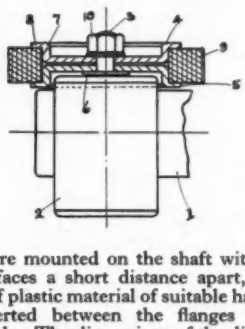
Describes a release mechanism for yarn tension regulators of the type for operation inside a tubular pedestal of a twisting machine. 10 indicates the outer housing of the pedestal and within the housing is a cylindrical member 11 having an extension 12. A collar 14 screwed into the upper end of the housing bears upon a



flange at 15 to secure member 11 in position. The tension regulator 13 comprises a stationary member 16 secured to the member 11, and a movable yarn-engaging member 18 is urged towards member 16 by a spring 19. The output tension in the yarn can be varied by adjusting the tension in the spring by means of a collar 20 which is threaded on to the extension 12. So that the position of member 18 may be varied, a pivot arm 25 is provided, the upper end of which is fixed to a plate 26 secured to the back of member 18. Arm 25 has a bi-furcated base 29 the legs of which terminate as knife edges 30 and 31. The knife edges rest in notches 32 and 33 and this arrangement permits limited movement of member 18 about the axes of the knife edges. On top of the pedestal is a yarn guiding cap 35. A support 41 is secured to the base of the cap and has a pair of knife edges 42 and 43 adapted to rest in a pair of grooves 44 and 45 in the upper rim of member 11. A U-shaped lever arm 46 extends into the pedestal from either side of the support 41. This arm has an extending section 47 to engage the inner wall of member 11 when the cap 35 is in normal operating position, and a cross bar 48 is adapted to engage the arm 25 when the cap is turned about its pivot, thereby forcing member 18 away from member 16. The extending end of the lever arm 46 is normally held in contact with the pedestal wall by a spring 49, thereby retaining the cross bar 48 out of contact with the arm 25 when cap 35 is in normal operating position.

799,586 Circular Looms
FAIRBAIRN LAWSON COMBE BARBOUR LTD., *Wellington Foundry, Leeds* 1.

A pusher block assembly for a circular loom shuttle drive comprises a bracket 1 provided with a foot mounted on a rotating driving ring (not shown). The bracket has a bearing mounting 2 which carries a shaft 3 driven from the gearing provided, and carrying a roller. The roller is formed from two discs 4 and 5, the inner disc resting against a shoulder 6 formed on the shaft. Each disc is flanged at 7, the flange having a turned-over edge 8. The two



discs are mounted on the shaft with their inner faces a short distance apart, and a cot 9 of plastic material of suitable hardness is inserted between the flanges during assembly. The dimensions of the discs and cot are such that when the edges of the two discs are pressed against the cot, a slight space exists between the inner faces of the discs. The roller is completed by a clamping nut 10 which is applied to the end of the shaft and screwed tight. This nut not only clamps the discs to the shaft against the shoulder 6, but also ensures that the edges of the discs grip the cot and hold it in place. When the device is mounted on the loom the surface of cot 9 engages with the warp curtain of the yarn, and drives the idler wheel and its associated shuttle through the warp yarns.

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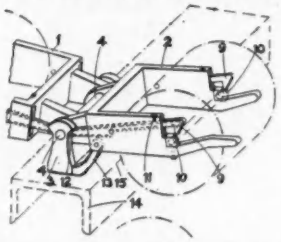
799,744 Winding Machine Bobbin Holders

BARMER MASCHINENFABRIK AKT. GES., *Wuppertal-Oberbarmen, Germany.*

Relates to bobbin holders for winding machines, having pivotable carrier stirrups. The two stirrups 1 and 2 are pivotable on the common bracket 3, being mounted back to back on a shaft 4. The bobbin pin holder is the same on each stirrup arm, and consists of a double-armed lever 9 one of whose free ends is constructed as a pawl and which during winding completes the actual bobbin pin bearing 10 whilst being urged into this position by a compression spring 11. When the stirrup is lifted upwards and the bobbin is moved into the exchange position, the other free end abuts against a stop 12, whereby the other end of the lever is lifted and the bearing 10 is opened and the bobbin released. The carrier stirrup 2



is held in the exchange position by a support 13 which is suspended under the stirrup arm, and carrier stirrup 1 has a similar arrangement. The support is so suspended that, when the stirrup is lifted upwards into exchange position, the support is released from the frame 14 and carries out a swinging movement. When the support has swung past the edge 15, the stirrup can be released, and the support is forced along the surface of the frame into the angle at the base of the common bracket 3. When the stirrup 2 is subsequently lifted slightly and then lowered into the winding position, the support 13 is again freed, swings backwards past the edge 15, and allows the stirrup to move right down into the driving position.

799,863 Yarn Tensioning Devices

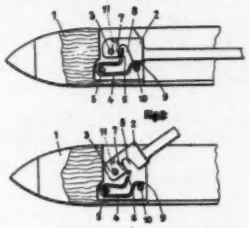
MASCHINENFABRIK SCHWEITER AKT. GES., *Horgen, Switzerland.*

A thread tensioning mechanism has not less than two tensioning devices arranged in series, the tensioning action of the devices being controlled by a common spring-biased pressure plate. A feeler is employed to respond to the tension of the thread between the feed tensioning device and the delivery tensioning device, the feeler operating to cause the pressure exerted by the pressure plate to be relieved when the tension increases.

799,911 Shuttle Tongue Springs

R. SCHMIDT, 27 *Wallenstein, Bez. Kassel, Germany.*

Describes a shuttle having a spindle, kept in the weaving position by means of a spring arranged in the shuttle head and acting on the spindlehead. The spindle is mounted in the cavity of shuttle 1 by means of a pin 3 passing through the spindle head 2. A leaf spring 4 placed in the shuttle with its loop round a pin 5, serves as the retaining spring, and the end of its arm 6 acts resiliently on the edge 7 of a recess 8. The other arm end 9 of the spring is



supported on a pin 10. When the spindle is folded down ready for use the arm 6 engages deeply in the recess 8, and the edge 7 forms the sole contact between the pressure spring and spindlehead. When the spindle is lifted half up the pressure spring 4 is tensioned most strongly, because the edge 7 during its movement in an arc around the axis 3 has reached the greatest horizontal distance from the axis. The spring is able to bend flexibly round the support 5 corresponding to this maximum pressure. When the spindle is completely lifted, and the edge 7 head is swung out upwards, the spring is then tensioned just sufficiently to keep the spindle in the lifted position. A single oil hole 11 with two outlet bores is provided for lubricating the swivel bearing of the spindle, one of the outlets leading to the pin 3 and the other to the wall of the recess 8 above the edge 7.

799,916 Nylon, etc. in Loom Buffers

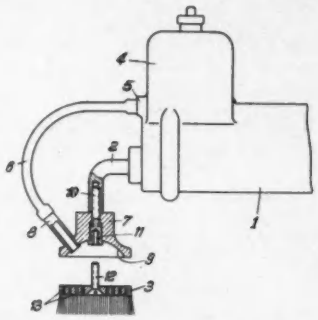
ALBERT HAAG PICKERFABRIK, 1 *Möttlingerstrasse, Weil der Stadt/Württenberg, Germany.*

Buffers for looms for checking the picker as well as the picking stick, and made of leather, have the disadvantage that their spring effect is lost far too soon and must be replaced after a comparatively short time. An improved buffer includes a flat-sectioned spring manufactured from a number of bands of drawn polyamide such as nylon secured together by adhesive. Buffers with this improved spring have a uniform spring effect, and last for a long time without crushing or breaking in spite of very great stress.

800,063 Removing Stains from Fabrics

H. GLAESER, 3 *Fellnerstrasse, Frankfurt/Main, Germany.*

Removal of stains from fabrics by means of beating with simultaneous treatment with a cleaning liquid, and the object is to make the beating treatment less time consuming and more efficient. The device consists of a vibrator 1 having a vibratory member 2 which is arranged so that a suitable tool for the beating treatment can be attached to it. A container 4, for the reception of a cleaning liquid is fixed to the vibrator, and a flexible tube 6 is connected at an outlet 5 of the container. To



the free end of the member 2 is secured a tool support 7, which serves as a holder for a nozzle 8, which is connected to the tube, and also as an organ for conducting liquid to the beating brush 3. The support 7 comprises a body with a concave lower part which forms, with the beating device, a hollow space 9. The brush has bores 13 extending through its back, and these bores feed cleaning fluid to the bristles of the brush from the liquid space 9. The attachment of the support 7 to the member 2 is effected by a screw 10, the head of which has a bore 11 for engagement by a screw 12 provided on the brush. For adjustment of the liquid supply it is possible to provide, at a suitable location, a regulating valve which can be operated by means of a proportioning knob.

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SPINNER required for 100% man-made fibre blends. The yarn to be white and spun on woollen system. Box No. TL27, "Textile Manufacturer," 31 King Street West, Manchester 3.

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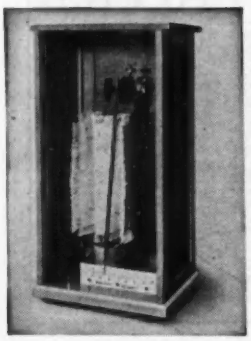
SPINNERS

Moisture Regain and lap weight



The difficulty of correcting lap weights for varying moisture conditions can be overcome by installing a "SHIRLEY" Moisture Regain Indicator in the blowing room. This instrument gives a continuous reading of the regain to be expected in the cotton or viscose rayon being processed.

Please send for leaflet SDL/8P

SHIRLEY DEVELOPMENTS LIMITED
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Telephone: DEAnsgate 5926 and 8182

Machinery, Plant, Accessories For Sale

TWO-AND-A-HALF ton Morris Mobile Crane, unused and guaranteed as new, at half list price. Alan R. Davies Ltd., 20 Whiteladies Road, Bristol 8 (Tel.: Bristol 38418).

On instructions from Sir Elkanah Armitage & Sons Ltd.

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and
VICTORIA MILL, PATRICROFT

EDWARD RUSHTON SON & KENYON will sell by auction, piecemeal, on the premises, on TUESDAY, WEDNESDAY and THURSDAY, SEPTEMBER 15th, 16th and 17th, at 11 a.m. prompt each day, the

COTTON SPINNING, DOUBLING AND WEAVING MACHINERY

including 6 Platts' ring doubling frames (beam to flange bobbin) 150 sp, 4½" ring, 5½" gauge, 7" lift, 1946; Scragg Bolton system ring doubling frame 128 sp, 3½" ring, 5" gauge, 8¾" lift; 9 Platts' ring doubling frames 292 sp, 2½" ring, 3½" gauge, 8" lift; Knowles high-speed beaming headstock and magazine creel; winding and warping machinery; 2 Barber Colman portable warp knotters; 2 132" and 1 160" Hall plain looms; 22 Northrop automatic looms model F and HF, 82", 80" and 72", 1938-1947; 6 Northrop model LF light canvas looms 80", single shuttle, 1938; 6 ditto 76", 12 ditto 38", 1947; large quantity new spares for looms and other textile machinery; Simonett 78" and 42" shearing machines; Sellars' 80" brushing machine; folding, damping and rolling machines; inspecting and measuring machines; plaiting machines; sewing machines; hydraulic bundling press; dial precision and other weighing machines; 50' stenter; test room equipment and controlled temperature installation; baskets; 500 hampers; bobbins, cheeses and pirns; Broomwade compressors 100 and 40 p.s.i.; steel runways; electric blocks; chain pulley blocks; battery trucks and chargers; warehouse trucks; canteen equipment; mechanics' tools; Gent pulsynetic clock system; mill furnishings and new stores; A.C. electric motors; shafting; also a large quantity scrapped textile machinery.

On view one week prior to sale from 9 a.m. to 5 p.m. (noon on Saturday) and on mornings of sale.

Catalogues from EDWARD RUSHTON SON & KENYON, 12 York Street, Manchester 2. Tel.: CENtral 1937; and 50-51 Broad Street Avenue, Blomfield Street, London, E.C.2. Tel.: LONdon Wall 4601.

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MANUFACTURERS of sectional water storage tanks, 50 to 40,000 gallons capacity. Sewage and Effluent Pumps. G. L. Murphy Limited, Imperial Works, Menston, Nr. Leeds.

Machinery Plant and Accessories Wanted

WARDWELLIAN Braiders required, second-hand, please give details and prices to: J. Day & Co. Ltd., Harrow Manorway, Abbey Wood, S.E.2.

1 Terrell Pirn Stripper, Type K. 1 "Uster" Knotter 55 - 65 in. frame No. 3 preferred. Northrop No. 3 Butt Bobbins (up to 200 gross). Quantity of Schweiter Automatic Pirn Spindles. Northrop Automatic Box Looms, 60 - 65 ins.

Also

Rayon Bobbin Winding Machinery. Rayon Sizing Machinery. Horizontal Rayon Warping Mills, 84 ins. across swift, for beams 72 ins. between collars. Rayon Bobbins, 3¼ ins. dia. × 3¼ ins. between flanges or thereabouts up to 5,000. Box No. TL26, "Textile Manufacturer," 31 King Street West, Manchester 3.

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